

PURCHASING

SEPTEMBER, 1949



N. J. Gibbins:

YOUR BUSINESS—
MY BUSINESS—OUR BUSINESS

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A CONOVER-MAST PUBLICATION • 50 CENTS

This emulsion out-performs cutting oil



**Texaco Soluble Oil
Heavy-Duty increases machine
output, reduces unit costs.
Assures cleaner plant.**

Emulsions made with *Texaco Soluble Oil Heavy Duty* are out-performing straight cutting oils on many jobs, such as broaching, drilling, turning and threading. They cool the work better, assure faster production and longer tool life.

In addition, there is less carry-off from emulsions with *Texaco Soluble Oil Heavy Duty*. This means savings in material consumption as well as in cleanup expense. These emulsions are highly stable and are not affected by normal contamination with the

MACHINE:
No. 3A, Warner & Swasey Turret Lathe.

PART:
3" x 16" tapered flange, normalized S.A.E. 1040 steel forging.

OPERATIONS:
Drill 3" from solid, turn O.D., turn face, chamfer, tap tapered thread.

RESULTS:
With an emulsion of *Texaco Soluble Oil Heavy Duty*, threading speeds were same as when sulfurized cutting oil was used, but threads produced were smooth and passed critical inspection, machine output was increased, unit costs were reduced. Finish on all operations was excellent.

machine lubricant.

There is a complete line of *Texaco Cutting, Grinding and Soluble Oils*. A Texaco Lubrication Engineer will gladly help you select the right ones to give you greater output and lower costs whatever the metal or your method of machining it. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.



**TEXACO CUTTING, GRINDING AND
SOLUBLE OILS FOR FASTER
MACHINING**



Century
**PROTECTED
MOTORS**

Let You Forget About Atmospheric Hazards

Shown here are four basic types of Century Protected Motors which are designed to resist the dangers of hazardous atmospheres. A properly selected Century motor—with the right protection—is the ideal combination for a long life of satisfactory performance.

1 Open Protected—Form J, general purpose motor—meets the needs for most installations where operating conditions are relatively clean and dry. The top half of the motor frame is closed to keep out falling solids or dripping liquids.

2 Splash Proof Motor—gives the necessary protection where plants must be washed down—keeps water out of the motor even when a hose is applied directly on the frame. It also provides protection

against rain, snow, sleet and ice for outdoor installations.

3 Totally Enclosed Fan Cooled Motor—protects against dusts, mist or fog that might be detrimental to the vital parts of the motor. The inner frame protecting the motor is sealed to keep out harmful matter.

4 Explosion Proof Motor—protects against atmospheres charged with explosive dusts or gases. They carry Underwriters' label for specific kinds of hazards.

Century builds a complete line of alternating and direct current motors in a wide range of types and kinds—in sizes from 1/6 to 400 horsepower.

Specify Century motors for all your electric power needs.

Popular types of standard ratings are generally available from factory and branch office stocks.



CENTURY ELECTRIC COMPANY 1806 Pine Street • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities



First step toward an automobile

A typical example of B.F. Goodrich product improvement

THAT picture, taken 1200 feet underground, shows iron ore that in a few weeks will become a steel automobile body. The moving belt collects the iron ore (often in chunks too big for any man to lift) and carries it up and out — cheaper, faster than the old car-and-locomotive method.

But the belts take a terrific beating — iron ore is not only heavy but lumps also have sharp, cutting edges. Repairs to belts that far underground would be costly, almost impossible. The mine superintendent who decided on this

belt chose B.F. Goodrich because of this company's long history of making belts for "impossible" jobs.

BFG engineers developed a belt to meet these harsh conditions, with extra thick, cushioning cover. It has already been running a year with no slightest sign of wear. Miners and owners both prefer it over old methods, and cost of mining is the lowest that mine ever knew.

Reducing costs for business is our business. B.F. Goodrich improvements in products have resulted in V belts

which outlast previous belts 2 and even 3 times, rubber linings which reduce the cost of handling acid and at the same time protect workers from injury, hose which reduces cost of drilling oil wells because it lasts so much longer — and hundreds of other product improvements which have benefited every industry. For latest cost-saving ideas in rubber, call your B.F. Goodrich distributor or write *The B.F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F. Goodrich
RUBBER FOR INDUSTRY



For a
LIGHTER
Yet
STRONGER
Product...

Put the squeeze on "DEAD WEIGHT"



If your product is made of steel, it may be made lighter and more efficient—yet stronger and more durable—if it is made of HI-STEEL. Inland HI-STEEL permits the use of much greater unit stress in design, and has 50% greater ability to stand up under impact loads. That's why HI-STEEL sections can be up to 25% thinner—thereby minimizing dead weight and permitting one-third more units to be produced from every ton of your steel. In addition, HI-STEEL is far more resistant to abrasion and to atmospheric corrosion. It can be easily worked, hot or cold.

Write for booklet. INLAND STEEL CO., 38 S. Dearborn St., Chicago 3, Ill. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

HI-STEEL meets the requirements of SAE Specification 950.

**INLAND
HI-STEEL**

REG. U. S. PAT. OFF.



THE LOW-ALLOY HIGH-STRENGTH STEEL

... OSBORN FASCUT® POWER IMPROVE AUTO BUMPER



Above, photo 1: Rotary machine equipped with Osborn Fascut Brushes. Machine turns clockwise as brushes polish top edge of bumpers. Upper right, photo 2: Close-up of Fascuts on rotary machine applying final brushing operation to top edge of bumpers.

THE Auto-Lite plant at Sharonville, Ohio, is one of the world's largest producers of steel bumpers for motor cars.

By means of new finishing techniques, involving the use of Osborn Fascut® Power Driven Brushes, the company is mass producing auto bumpers with a satin-smooth high lustre finish that is extremely rust-resistant.

After forming, the bumpers are conveyed to a rotary machine equipped with Osborn Fascut

Power Brushes. Here, metal pit marks and surface imperfections are brushed away and the bumpers prepared for subsequent plating.

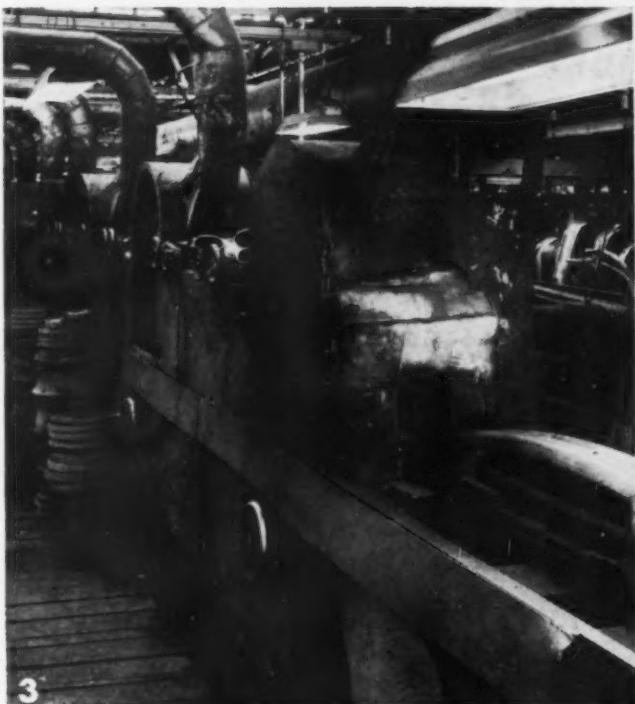
According to Company officials, the use of Osborn Fascut Power Driven Brushes results in fewer 'rejects' and reduces production costs.

The finishes on your metal products can be improved by the use of one or more of Osborn's complete line of cost cutting Power Driven Brushes. Contact us today.

Dept. 189, 5401 Hamilton Avenue

THE OSBORN MANUFACTURING COMPANY
CLEVELAND 14, OHIO

BRUSHES REDUCE 'REJECTS', FINISH FOR AUTO-LITE



3



4



5

Upper left, photo 3: An in-line polishing machine equipped with Osborn Fascut Power Brushes applying finish to face of the bumpers. Upper right, photo 4: Close-up of one of several Fascuts used with an in-line polishing machine. Lower left, photo 5: General view of "end" machine polishing curved ends of Auto-Lite bumpers.



WORLD'S LARGEST MANUFACTURER OF BRUSHES FOR INDUSTRY
POWER DRIVEN BRUSHES • PAINT BRUSHES • MAINTENANCE BRUSHES

KEARNEY & TRECKER
MILWAUKEE

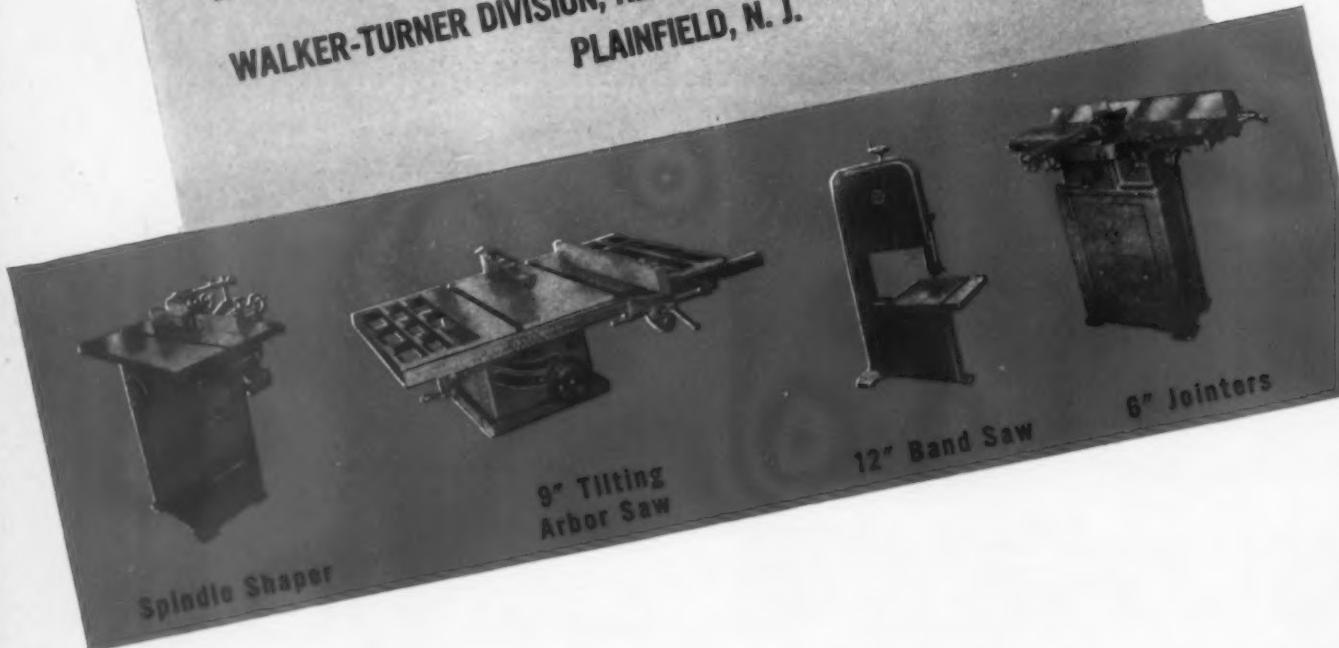


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SPECIAL EQUIPMENT...

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VOLUME PRODUCTION.
HIGH QUALITY AND
POPULAR PRICES...

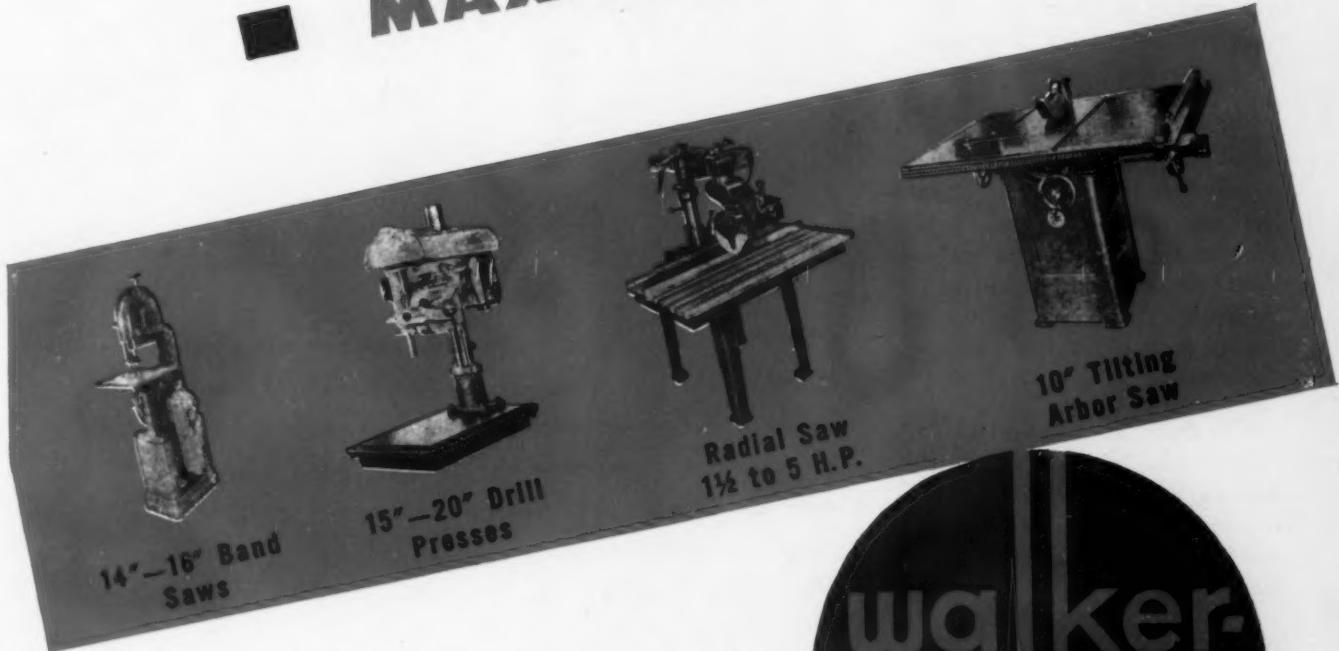
Combining the experience of two pioneer organizations
and their affiliated research, manufacturing facilities and
know how—the Walker-Turner Division at Plainfield,
N. J. is now supplying light machine tools of ever-
increasing standards of performance, long life, and trouble-
free operation.

WALKER-TURNER DIVISION, KEARNEY & TRECKER CORPORATION
PLAINFIELD, N. J.



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 ■ IMPROVED FACILITIES
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to Troublesome **SEALING and PARTS** Problems

This test tube has contained the answer to many perplexing sealing problems, many machine part and product "bugs." It will have the answer to your difficulties if you put our skilled Engineering and Laboratory Staffs on the job.

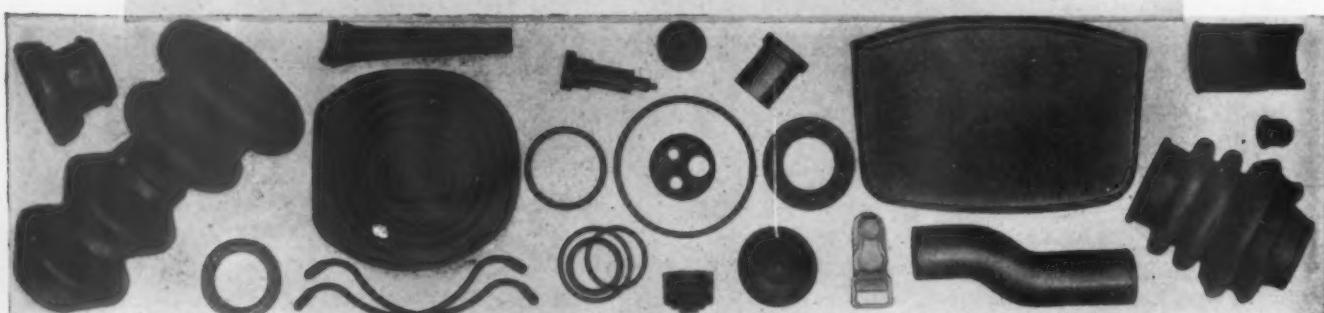
Years of constant research, extensive modern laboratory and production facilities place us in top position to design and precision-mold to exact specifications any part or product of natural or synthetic rubber in any quantity by compression, injection or transfer methods.

• Our daily job orders resemble a "who's who" listing of industrial leaders, yet a large percentage of our production is shipped to specialty manufacturers and small industrial plants.



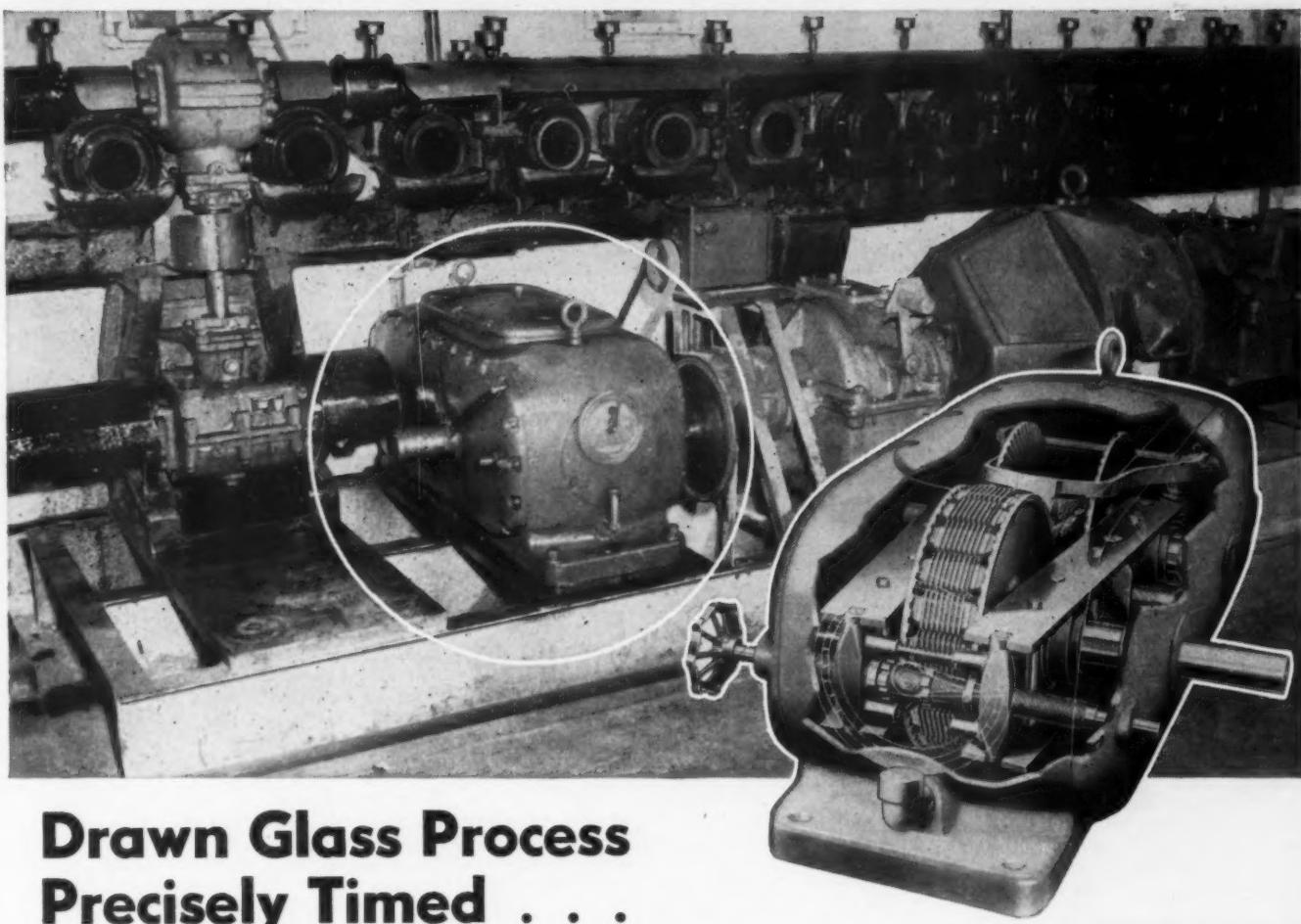
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Drawn Glass Process Precisely Timed . . . by Link-Belt P.I.V. Variable Speed Drive

*Lehr Rolls Accurately Synchronized with
Drawing Machine to Avoid Buckling*

In making drawn sheet glass, the drawing machine and annealing lehr must be kept "in step" to avoid deformation of the still plastic sheet. In the Libbey-Owens-Ford window glass factory at Shreveport, La., this is accomplished by means of Link-Belt P.I.V. Variable Speed Drives. In one instance, the drawing machine is driven through a P.I.V. Variable Speed Drive, allowing its speed to be accurately calibrated to that of the lehr. In the application illustrated, the P.I.V. Variable Speed Drive is used in driving the lehr rolls, whose speed is calibrated to agree with that of the drawing machine.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 3, Minneapolis 5,
San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

LINK-BELT

Power Transmission Machinery
"THE COMPLETE LINE"

Machinery builders incorporate Link-Belt P.I.V. Variable Speed Drives in the mechanisms of many types of glass working machinery, and they are easily adapted to existing drives using speed change gears. The unique principle of the P.I.V. Variable Speed Drive allows the machine speed to be varied while running, rather than requiring a stop for gear change. It also provides for an infinite range of speeds, without stop. Speed once set is maintained indefinitely without slip or creep. Simple, durable and efficient, the Link-Belt P.I.V. Variable Speed Drive requires practically no attention or upkeep. Available in plain or motorized models, with or without extra reduction gears, for vertical or horizontal mounting, up to 25 H.P.

• • •

Send for Book 1874-B, giving full description and application data.



1. **ALUMINUM EXTRUSIONS**—How a single extrusion will frequently eliminate the assembly of two or more parts is explained in bulletin telling about the advantages of aluminum extrusions. It also explains how shapes are produced and how special shapes to fit particular needs may be designed. Reynolds Metals Co., Aluminum Divn.

2. **BABBITT**—Leaflet details DzI heavy duty babbitt for bearings subject to combined weight, heat and shock. It is recommended for connecting rods and main bearings of all types of Diesel engines, large compressors, and for Pitman or eccentric bearings of trap rock crushers. It can be handled with normal babbitting procedures. Magnolia Metal Co.

3. **PAPERS**—You may want for ready reference sample books of Carlton Bond, Carlton Ledger and Carlton Mimeograph and Duplicator papers available from the Northwest Paper Co. These contain swatches of colors and finishes in each grade plus the usual figures on weights and sizes.

4. **CORE BAKING**—Savings in time, space, operational and maintenance costs are among the benefits listed in laboratory report on experience with Ther-Monic Electronic Core Baking Equipment, made by Massachusetts company. This is an interesting, informative report. Induction Heating Corporation.

5. **OIL CIRCUIT BREAKERS**—Bulletin 71B6129D details Allis-Chalmers oil circuit breakers, Types DZ-60B, DZ-100B and DZ200B, which are adapted to wide application in central station and industrial service where economy of operation and space are important factors. They are available in a choice of seven different arrangements. Bulletin contains reference chart of general dimensions. Allis-Chalmers Mfg. Co.

6. **BATTERIES**—Battery Selector Bulletin, GB1055, to guide purchasing agents, plant engineers and others in selecting correct batteries for industrial trucks has been issued by the Gould Storage Battery Corp. It contains two pages of specifications for almost 100 different size and capacity batteries.

7. **NEW PACKING STANDARDS**—Booklet listing standards for leather and synthetic rubber packings has been issued by E. F. Houghton & Co., following Joint Industry Conferences on Hydraulic Packings and Seals. The Houghton standards serve to simplify the selection of packings

by reducing the number of sizes and thereby cutting down inventories. Interchangeability and easy identification is facilitated by establishment of dash numbers.

8. **PIPE INSULATION**—Folder describing Kaylo pipe insulation explains how the simplified dimension standards make it possible to build up multiple layers of insulation, and thus reduce inventory problems. The bulletin contains complete information for specifying and using this calcium silicate insulating material which is effective throughout the temperature range from 200° to 1200° F. Kaylo Divn., Owens-Illinois Glass Co.

9. **LOW TEMPERATURE Melting Alloys**—Folder lists known applications and uses for low-temperature-melting alloys. A number of eutectic and non-eutectic alloys have been standardized. The applications and physical properties of the standard Cerro alloys (containing bismuth) are listed, along with long list of uses. Additional informative literature is available. Cerro De Pasco Copper Corp.

10. **PLASTIC CAPSULE VIALS**—Catalog sheet illustrates and describes Clearsite plastic capsule vials, for capsules, tablets and powders. They are available in emerald green and crystal clear with polyethylene closures. They are unaffected by common acids, alkalis or alcohols, are featherlight, and shatterproof; can be labeled easily and securely. Celluplastic Corp.

11. **SOLDERING FLUXES**—Technical Data Sheet No. 5-2 tells about Flosol soldering fluxes that "wet oily surfaces, clean and flux perfectly." They are for use in the soldering of sheet metal and other products constructed of carbon and stainless steels, brass, copper, tin, terne plate, zinc and galvanized iron. They are available as liquids, pastes, and creams. American Chemical Paint Co.

12. **PRODUCTION BRAZING**—Lower production costs for metal joining of superior quality and strength are one of the advantages attributed to automatic, high efficiency, gas-fired brazing with the Gradation brazing machine. The machine and its work are described in literature just released by the Selas Corporation of America.

13. **FLUORESCENT LIGHTING**—New 74-page catalog covering its complete line of fluorescent lighting fixtures has been issued by Sylvania Electric Products Inc.

It has three main sections—industrial, commercial-residential and troffers, each a complete catalog in itself and can be detached as a separate unit. Industrial section contains full page of illustrations of seven mounting methods, and series of photos shows how to remove and replace lamps and reflectors for servicing. Get your copy today and bring your lighting files up-to-date.

14. **VALVES**—Two new bulletins, Nos. 350-1 and 254-1, issued by the Minneapolis-Honeywell Regulator Co., Belfield Valve Divn., give data on Belfield "On-Off" air-operated diaphragm control valve, and the Schaefer By-Pass—an economical unit for by-passing valves and traps which is said to save labor, weight, maintenance, leaks, space and expense.

15. **PLANT MAINTENANCE**—Interesting, handy "Maintenance Checking Chart" issued by United Laboratories, Inc., lists maintenance jobs for roofs, floors, various types of surfaces, waterproofing and damp-proofing, insulation, and so on, and the products recommended for the specific jobs.

16. **ALUMINUM CABLE**—Data book on Kaiser Aluminum ACSR and All-Aluminum Cable, designed for clarity and easy reference on their physical and electrical properties, has been issued by Permanente Products Co., Aluminum Divn. Production is now underway at Newark, Ohio, plant.

17. **CHAIN DRIVES**—New 36-page illustrated book No. 2065 gives complete information on Link-Belt Company's silent chain drives for automotive and industrial engines, busses and trucks. It is complete with tables of dimensions, center distances, pitch diameters of wheels, horsepower tables, data for calculating chain drive centers, etc. Link-Belt Co., Ewart Plant.

18. **PROCESS CONTROL**—"Panelmount" Capacitrol series of indicating, pyrometer controllers for temperature, voltage, current, speed and similar variables in process industries, are the subject of Bulletin PC-1 just released by Wheelco Instrument Co. These operate on the "Electronic Control Principle."

19. **METAL STAMPINGS**—Small Lot Metal Stamping Service with Lowest Possible Die Costs, by patented process, is subject of new bulletin just issued by Dayton-Rogers Mfg. Co. D-R type of tools can be built for as low as 15% to 20% of cost of conventional permanent tooling. Maximum blank size 22 x 22; maximum thickness $\frac{3}{16}$ "; average die life 9,000 to 20,000 blanks; maximum drawing capacity $\frac{3}{8}$ " deep. Complete stocks of various metals available.

20. **V-BELT DRIVES**—Its brand new—96-page V-Belt Drive catalog. It contains stock drive tables, engineering data and examples to help select a "Sure Grip" V-Belt Drive. Sections are also devoted to special drives, sheaves, V-belts, and general engineering information. T. B. Wood's Sons Company.

21. **SMALL CUTTING TOOLS**—Midget Mills are the subject of new catalog No. 17 which also includes the deburring group, tubing cutter group, countersink group and miscellaneous mills, shanks, files, rasps, etc.—high speed, cast alloy, cemented carbide, issued by Severance Tool Industries, Inc. This is a sort of tooling manual for it contains many suggestive

(Please turn to page 14)

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This Nicholson cartoon ad is one of many appearing monthly in *The Saturday Evening Post*.

STEADY advertising and good distribution can help a product gain the top, but only consistently *high quality* and *good value* can keep it there. That's where Nicholson and Black Diamond files have been for many years—to make Nicholson the world's largest file manufacturer.

High quality in these world-famous files is a combination of a number of things: Expert design (always *The right file for the job*), high-grade file steel made to our own specifications, even-surfaced blanks and accurate cut, uniformly correct hardening . . . these are major features assured through rigid controls and check-ups at every stage of production.

Whether you use files in large or small quantities, you're money ahead with dependable, fast-cutting, long-lasting Nicholson or Black Diamond brands. Let your industrial distributor be your consultant as well as your supplier.

Free book, "FILE FILOSOPHY," for your key shop and purchasing men. How many copies?

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(Continued from page 12)

uses of the tools described and also pertinent technical data.

□ 22. INDUCTION HEATING—How savings in equipment investment can be made with the Ajax-Northrup heating principle applied at 60-cycles, are explained in bulletin describing low frequency induction heaters, just released by the Ajax Electrothermic Corp.

□ 23. PLATE FABRICATION: Also Heat Exchangers—This bulletin describes the typical plate fabrication services of the Downingtown Iron Works who are able to fabricate riveted and welded products varying from 3/16" to 1 1/4" in thickness; also, the company's specialized service and facilities for the fabrication of heat exchangers. Examples illustrated. Engineering consultation available.

□ 24. AIR VALVES—New line of solenoid operated valves for air pressures of 0 to 125 psi, and double solenoid valves for air pressures 0 to 125 psi are described in Folder-S just issued by Valvair Corp.

□ 25. CENTRIFUGAL STEEL CASTING—Two new bulletins dealing with techniques for the casting of high alloy steel centrifugally in permanent metal molds, are available from the Cooper Alloy Foundry Co. Developed originally for mass production of jet engine rings, the methods have been adapted to the production of other cylindrical components, such as pump liners, seat rings, etc.

□ 26. VISUAL OILERS—Eight-page booklet featuring latest line of Gits visual oilers shows specific applications including gravity feed, wick feed, constant level vibrating rod and multiple oilers. It gives detailed catalog information on every oiler. Gits Bros. Mfg. Co.

□ 27. SILICONE GREASES—You will find two new publications on Silicone greases, No. D-5 and No. D-6, issued by Dow Corning Corporation, highly informative and of much interest. D-5 details the properties, performance and uses of these heat stable and oxidation-resistant silicone lubricants which are recommended for use over a temperature range of 400° F. D-6 contains information on "How to use DC 44 Silicone grease in the bearings of electric motors." Bearings properly designed and prelubricated at the factory with DC 44 grease will give trouble-free service for the life of household appliances and industrial equipment, it is indicated.

□ 28. AIR SHIPPING—The proper, economical use of air express, air freight and

cir parcel post are detailed in data book "How to Ship by Air in Corrugated Boxes" issued by Hinde & Dauch Paper Company. This practical booklet is illustrated with plates, charts and diagrams, and includes a section on corrugated packaging materials for fragile items.

□ 29. ADJUSTABLE SPEED AC MOTOR—New 12-page bulletin describes an AC motor having infinitely adjustable speed, known as the Adjusto-Spede. It operates direct from a 2 or 3 phase a-c line, and is especially suited for driving equipment requiring constant torque input throughout its operating speed range. Continuous duty speed ranges as high as 10 to one are possible in the smaller sizes; intermittent duty speed range is infinite in all sizes. The Louis Allis Company.

□ 30. FORM DRESSING Grinding Wheels—New wheel forming attachment does the job in hours instead of days. It is known as the Diaform Wheel Forming Attachment, and produces accurate split dies, punches and flat forming tools from solid, hardened steel on horizontal spindle surface grinders. It is capable of accurate form wheel dressing in "tenths" of a thousandth of an inch. New bulletin describes the Diaform in detail. Pratt & Whitney.

□ 31. WELDING, CUTTING—Airco welding and cutting products—gas, arc—apparatus, supplies and accessories are detailed and illustrated in new catalog issued by Air Reduction.

□ 32. LINK V-BELTS—They are adjustable to any length, and adaptable to any drive, and can be installed in a few minutes from a stock reel. They lower the investment in spare belts and storage space. Installation savings can run as high as 75% to 90%. Easy tension adjustment eliminates slippage. Belts save money in many ways. Veelos link V-Belt catalog gives full details. Manheim Manufacturing & Belting Co.

□ 33. JACKLIFT TRUCKS—Two new equipment units for lowering material handling costs are described in Bulletin 24 issued by Lewis-Shepard Products Inc., namely the Jacklift power truck, and the Jackstacker which is a combined electric lift truck and electric stacker for both horizontal and vertical movement of material on skids and single or double faced pallets.

□ 34. HEAT TREATING—Broadside illustrates and gives full information about furnace for tool room or shop that operates over temperature range of 300°-2400° F.

with uniformity at every point. In one furnace you get low, or high temperature or in-between heat treating. Use of inverted muffle section converts unit from semi-muffle to full-muffle design to protect work from products of combustion when atmosphere is employed. Sunbeam Stewart Industrial Furnace Div.

□ 35. TAP DRIVING EQUIPMENT. That is the subject of special manual just issued by Scully-Jones & Co. Standard tap chucks, heavy duty tap holders, spring compression holders, tension and compression styles, floating tap driver holders and close center tap drivers are discussed for use in machines having a spindle, holder or attachment with Morse Taper hole, multiple tapping machines and spindle types. Tap charts, prices and specifications are included in the 17 pages.

□ 36. WIRE FOR HOT SPOTS—NEasbestos wire and cables which have asbestos or asbestos and varnished-cambric insulation, suitable for electrical installations where extreme heat, corrosive fumes and fire hazards are present, are subject of Catalog 509 announced by the National Electric Products Corp. The line includes 600 volt cable for motor connections and electric furnace leads; 600 volt control cable for boiler rooms and power stations, and 600 volt cable for hinge or jumper connections. It also includes 300 volt cable for a series of specific uses.

□ 37. COMPRESSORS—The Worthington line of air compressors in sizes ranging from 1/4 to 15 hp, 40 pounds pressure (single stage) to 250 pounds pressure (two-stage) and dry vacuum pumps, are described in Bulletin H-620-B30. Worthington Pump and Machinery Corp.

□ 38. COLLAPSIBLE TUBES—Catalog describes Sheffield Process Tubes which are made for a wide variety of products, from pure tin, Sheffaloy, lead, tin coated (lead case or core), and aluminum; also Vincote inner coated tubes which can be used for strongly acid or alkaline products, leakable oils, greases and other commodities. The Sheffield Tube Corp.

□ 39. ROTA-ROLL PUMP—Bulletin says this is not merely a pump—it's a pumping unit complete with pump, relief valve and strainer, the design of which promotes quiet operation and longer pump life. It is recommended for engine lubrication, compressor bearing lubrication, small capacity oil transfer, small cylinder actuation, etc. Units are available in six sizes. High volumetric efficiency of approximately 90% is obtained. Sundstrand Hydraulic Division.

□ 40. GAS COMBUSTION EQUIPMENT—Condensed catalog 292 issued by Bryant Industrial Division, Affiliated Gas Equipment, Inc., describes and pictures 33 items of gas combustion equipment. Capacity and dimensional tables are included for combustion assemblies, gas-air and air-gas mixers, blowers and boosters, burners, controls, valves and other accessories.

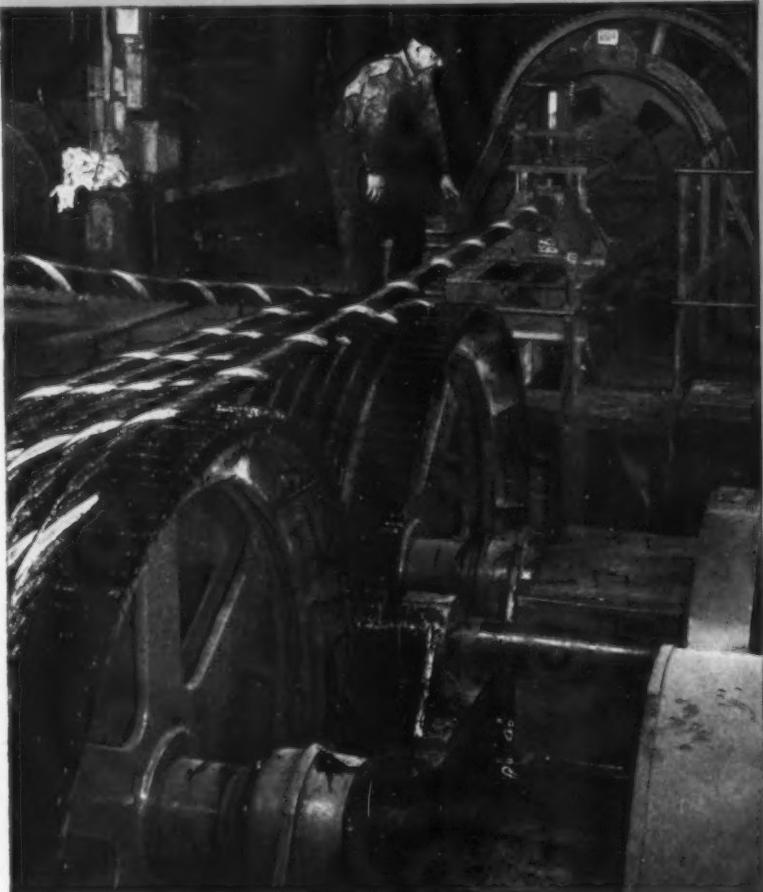
□ 41. EXHAUST FANS—The Bifurcator is a direct motor driven fan with a split housing for exhausting fumes or gases which are abnormally hot, corrosive, flammable or explosive. It is described in Catalog DB-4-48 issued by the DeBothezat Fans Divn. of American Machine and Metals, Inc. They are available in wide range of sizes delivering from 1400 cu. ft. of air per minute up to 45,000 cu. ft. of air per minute.

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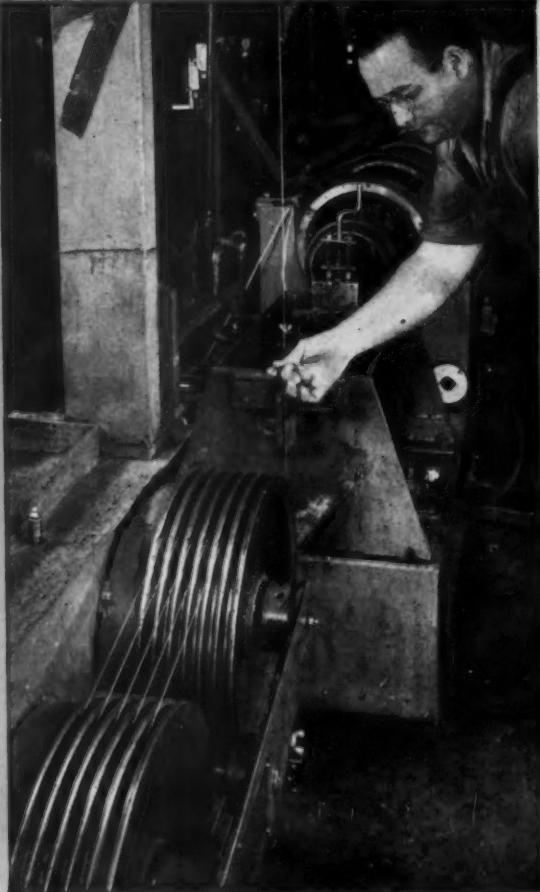
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This photograph shows a $3\frac{1}{8}$ " diameter Monarch Whyte Strand Wire Rope coming off a Macwhyte closing machine. Weight of this rope is approximately 16.65 pounds per foot. It has a strength of approximately 392 tons and is used for the digging line on large dragline excavator with 35 cu. yd. bucket.



In this photograph is a $\frac{3}{16}$ " diameter Stainless Steel Cord coming off a Macwhyte closing machine. It weighs approximately 0.35 lbs. per 100 feet; has a strength of approximately 270 pounds, and is used for many small cord needs.



Whether you need

LARGE WIRE ROPE or SMALL WIRE CORD

You will get smoother operation and better service when you use the wire rope designed and manufactured to meet your requirements.

Macwhyte engineers are always glad to suggest the correct Macwhyte rope or cord best suited to your needs.

Just drop a card or letter to Macwhyte Company or your Macwhyte distributor.

MACWHYTE COMPANY

2918 Fourteenth Avenue Kenosha, Wisconsin

Manufacturers of Monarch Whyte Strand PREformed, Internally Lubricated Wire Rope, Atlas Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

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make your selection from

a thousand and one
WIRE ROPES
made by
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USE AIR MAIL POST CARD — PAGES 19 & 20

(Continued from page 14)

They are installed as integral part of the duct system without changing the direction of the air flow or the size of the main line.

□ 42. BROACH SHARPENERS—Bulletin CS-4-36 describes Universal broach sharpener for both round and flat broaches. It reduces broach sharpening time up to 25% on internal broaches. Colonial Broach Co.

□ 43. AIR VALVES—21 different models of 4-way air valves are detailed in air valve catalog, Section 301. The 4-way types, which make for minimum maintenance, can be converted to 3-way valves for operating single acting cylinders. Suitable for pressures up to 150 psi, the valves are shown in hand, foot, solenoid, cam, and pilot types. Geroter May Corp.

□ 44. HOIST-JACK—What is it? It's a chain hoist, a powerful puller and a high lift jack, all in one. It is available in two capacities, 2,000 and 4,000 pounds. It is described in bulletin issued by the Coffing Hoist Co.

□ 45. PRESSURE RECORDER—Bulletin No. G620 on new Series 500 Absolute Pressure Gauges has been published by the Bristol Company. These new recorders make it possible to accurately record and automatically control absolute pressure within a scale range as low as zero to 20 millimeters of mercury absolute.

□ 46. FIRE HOSE—The B. F. Goodrich Co. has issued a 6-page catalog section on its lines of industrial fire hose. The brands are illustrated along with data on size, couplings and test pressures, and weight coupled and uncoupled for 50-ft. lengths. Gaskets, fittings and couplings are described.

□ 47. FLOOR MAINTENANCE—Three models of floor machines featuring low center of gravity, new principles of balance and reversible brushes and accessories, are described in four catalog pages just released by the Corbin Screw Div. of The American Hardware Corp. Accessories include variety of brushes for polishing, wet scrubbing, dry scrubbing, heavy wet scrubbing, and polishing and buffing.

□ 48. BORING MACHINE—8-page bulletin describes new precision boring machine built in two sizes of two models by the New Britain-Gridley Machine Divn., The New Britain Machine Co. One model is for straight boring and turning and the other with an additional slide for contour

work. The machines are particularly adapted to second operation work where accuracy of finish is required.

□ 49. SMALL SPEED CHANGER—Miniature variable-ratio speed changer which weighs less than 6 ounces is detailed in Bulletin 99. It has wide ranges of speed adjustment, input speeds, and output torques. Nominal maximum hp output .025; range of speed adjustment—ratio continuously variable from 1/6 to 6; permanent lubrication. Metron Instrument Co.

□ 50. LIVE CENTERS—"Engineered" live centers are the subject of catalog 449 issued by the Sturdimate Tool Co. It gives specifications and prices of the Standards which are made with Morse taper and also includes 3 types of Specials. Low overhand and slight cushioning action compensates for expansion due to heat, shock and excessive thrust loads, reducing wear to a minimum.

□ 51. AGITATORS—Side entering agitators are the subject of bulletin 482 issued by Industrial Process Engineers. They are for blending in extra large tanks, mixing in odd shaped tanks, conical bottomed crystallizers, sweeping the bottom of settling solids, etc., and for use in low headroom conditions.

□ 52. TESTING ACCESSORIES—12-page bulletin, No. 261-A describes supplementary devices which are used to adapt testing machines to the widest scope of testing conditions. More than 30 illustrations show the equipment and how it is used. The Baldwin Locomotive Works.

□ 53. POTASSIUM CYANATE—Bulletin describes physical and chemical properties of potassium cyanate. It is felt that the compound may find many applications in such fields as the production of pharmaceuticals, surface active agents and baths for treating metals. New Products Department, American Cyanamid Co.

□ 54. CONTROLLED AIR POWER—Bulletin describes the Hydro-Check made by the Bellows Co., for precision control of air power. It is an adjustable hydraulic resistance unit which permits the full use of the speed and flexibility of "controlled air-power" in the most sensitive tool or work feeding operations. The check is said to be particularly effective in milling and grinding operations, permitting a sensitive, accurately controlled, steady feed.

□ 55. NEOPRENE ADHESIVES—Neoprene Notebook, No. 42, gives pertinent information on Neoprene adhesives, and includes table of surfaces which they will bond successfully. The Rubber Chemicals Divn., E. I. du Pont de Nemours & Co.

□ 56. MULTI-SPOT WELDERS—Increased output, fewer man-hours and lower unit cost are listed as benefits of multiple spot welding equipment, in bulletin 8-013 published by the Taylor-Winfield Corp., which describes four basic types of multiple electrode machines.

□ 57. CAR SHAKEOUT—Lighter-weight car shakeout, Model GS, designed to unload up to 15 hopper-bottom cars of granular material in a day, is described in bulletin 130 issued by the Robins Conveyors Divn., Hewitt-Robins Inc.

□ 58. CASTERS—New line of forged-steel precision type heavy duty casters in 5", 6" and 8" diameter wheel sizes is described in 4-page bulletin issued by The Bassick Company. The casters are being used under loads as high as 10,000 lbs. per caster.

□ 59. MATERIALS HANDLING—"Time Savers" is the title of Bulletin 4881, which presents a variety of materials handling equipment supplementing the basic Barrett-Cravens Company's line of lift trucks, elevators, and storage racks. Illustrated are hand trucks, barrel skids, pallet trucks, reel trucks, barrel trucks, dollies, bar stock racks, storage racks, elevators, etc.

□ 60. OIL BURNERS—Series "B" low pressure air atomizing oil burners, which give efficient and economical operating results on metallurgical, ceramic, chemical and general industrial heating applications, are described in Catalog 409, recently released by Hauck Manufacturing Co. Complete fog-like atomization of oil is produced with low pressure blower air from 8 oz. to 2 lbs. or more pressure.

□ 61. ELEC. PLUGS, RECEPTACLES, Etc.—Automatic locking Midget Ever-Lok plugs, receptacles, and cord connectors are featured in 12-page catalog EL49-195 issued by Russell & Stoll Co., Inc. It is replete with illustrations, dimensional drawings and convenient ordering information.

□ 62. STEEL PARTITIONS—Movable steel partitions and the advantages and economies they make possible, are the subject of Catalog 49 issued by the E. F. Hauserman Co. This 68-page book is profusely illustrated showing installations in factories and offices, along with structural details.

□ 63. WOUND-ROTOR MOTOR—Wound rotor machines are the subject of Bulletin SR-1 published by Howell Electric Motors Co. The wound-rotor motor is said to lend itself particularly to applications requiring unusual electrical performance characteristics, making possible certain results which cannot be achieved by the squirrel-cage induction motor.

□ 64. PROTECTIVE PACKAGING—Swatch book contains samples of six of the most popular lines of Kimpak used for interior cushioning in packaging and many other purposes, including padding, filtration, protective linings, etc. Illustrations show different types used for protecting furniture, delicate instruments, liquid parcel post shipments, insulated pack for rainbow trout, and whipcord embossed for packaged candles.

(Please turn to page 19)

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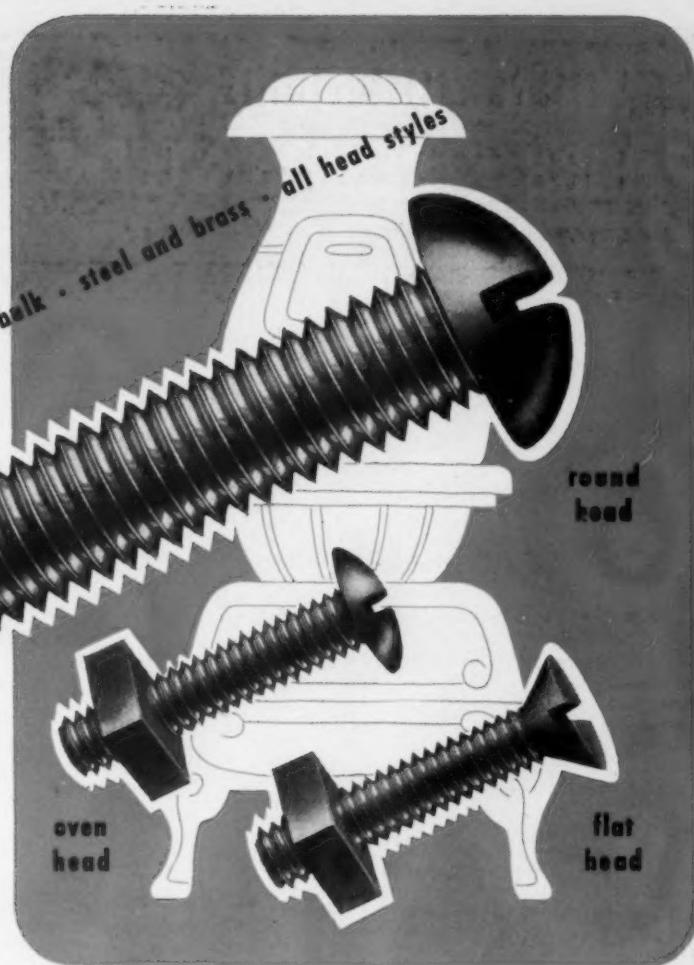
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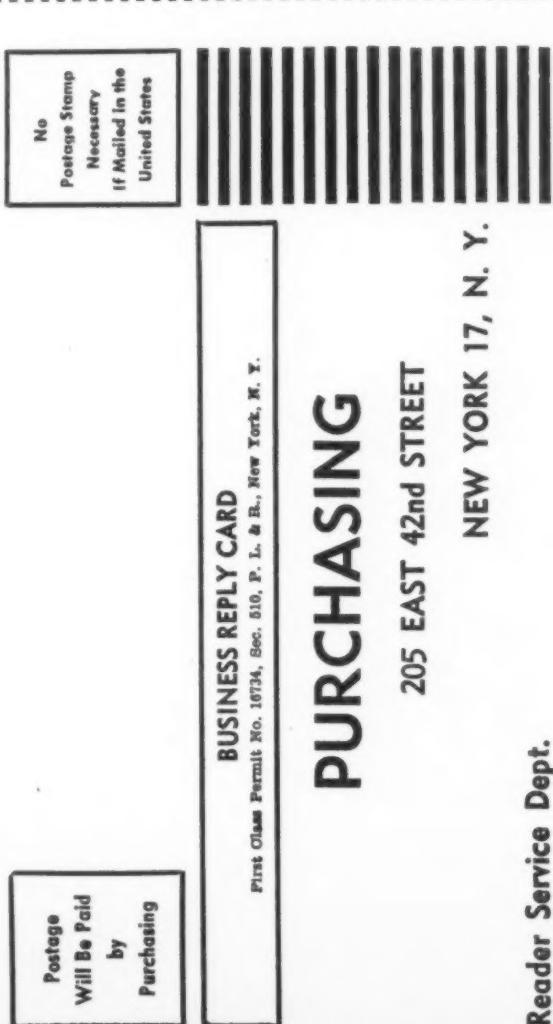
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- 65. SNAPGAGE**—Visibility, postiveness, simplicity, lightness, toughness and accuracy characterize snap gage available at the right price, described in literature available from Federal Products Corp.

66. NUTS FOR TESTING—Experimental quantities of Red Collar Elastic Stop Nuts are offered by the Elastic Stop Nut Corporation. They protect against vibration loosening, keep threads corrosive free, assure accurate bolt loading and seal against leakage along the bolt threads.

67. GUMMED TAPE—Booklet offered by the Hudson Pulp & Paper Corp. tells about Blue Ribbon Gummed Tape and how to speed up the sealing of packages in your shipping room.

68. SCREWS—Quick starting threads, perfectly center slots, no off-center heads.—That describes the screws covered by catalog No. 48 issued by the Eleco Tool and Screw Corporation.

69. MOTOR EXCHANGE PLAN—New time and money saving General Electric Exchange plan for Tri-Clad integral hp motors covers most popular types open drip-proof motors, one to five hp. Bulletin GEA is for motor users, and GEA 5180 is for machinery manufacturers. General Electric Co.

70. STAINLESS PIPE, TUBE—24-page manual is valuable guide for buyers. It includes data on type characteristics, physical properties, fabricating data, tolerances, standard finishes, corrosion resistance, etc. Peter A. Frasse & Co., Inc.

71. FLEXIBLE METAL TUBING—“Publication “Flexineering” tells about the way to eliminate vibration in exhaust or air lines, the transmission of liquids, volatiles, granular material or coarse abrasive products, by the use of Penflex tubing. Penna. Flexible Metallic Tubing Co.

72. ELECTRIFIED VISIBLE Record System—Booklet KD tells about an electrically operated record system, the Robot-Kardex, which is a mechanized file and desk in one space-saving automatic unit. Just press a key and the records in their slides are positioned. 30% saving in posting time. Systems Div., Remington Rand.

73. GAGES & EQUIPMENT—It's termed a “gold mine” of gaging information—the new catalog No. 11 just issued by Pratt & Whitney which contains complete listing of P&W gages and gaging equipment.

74. LUBRICATION—Wick oilers which provide controlled oil drops, hold generous supply in transparent plastic reservoir, and make for uninterrupted machine performance.

75. AN-COR-LOX—An-Cor-Lox lock nuts with positive locking action through metal locking ring, will be sent to you by Laminated Shim Co., Inc., An-Cor-Lox Divn. Bolt stretch, wear, moisture do not affect gripping power.

76. STOVE BOLTS—Easy-to-use catalog covers stove bolts which are available in complete range of sizes, package or bulk, steel and brass, all head styles. Sterling Bolt Co.

77. SAFETY POSTERS—“Blind Man” safety posters keep workers aware of the need for personal safety measures. Willson Products, Inc. will send you supply for use in your plant.

78. BUSDUCT—Plugin busduct saves time, money and electricity. It provides a plugin outlet every foot of the way. Can be mounted along walls, above baseboards or on ceilings. It is described in bulletin No. 701. Frank Adam Electric Co.

79. RETAINING RINGS—Truarc retaining rings secure parts together; they are quick and easy to assemble and disassemble; can be used over and over again; reduce costs and facilitate assembly or disassembly. Waldes Kohinoor, Inc. will send you a 28-page data book giving full details.

ance, are the subject of New Descriptive Booklet issued by Gits Bros. Mfg. Co.

- 75. UNIT HEATERS**—Now is a good time to think about heating comfort next winter. Send for copy of the Thermolier Catalog which describes unit heaters that are of low first cost, provide economy of operating, and quick, uniform heat. Grinnell Co., Inc.

- 76. LOCK NUTS**—Catalog and test samples of An-Cor-Lox lock nuts with positive locking action through metal locking ring, will be sent to you by Laminated Shim Co., Inc., An-Cor-Lox Divn. Bolt stretch, wear, moisture do not affect gripping power.

- 77. STOVE BOLTS**—Easy-to-use catalog covers stove bolts which are available in complete range of sizes, package or bulk, steel and brass, all head styles. Sterling Bolt Co.

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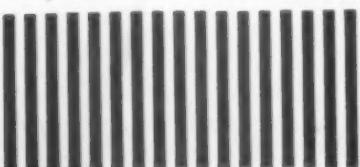
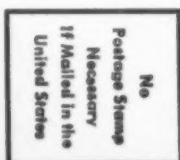
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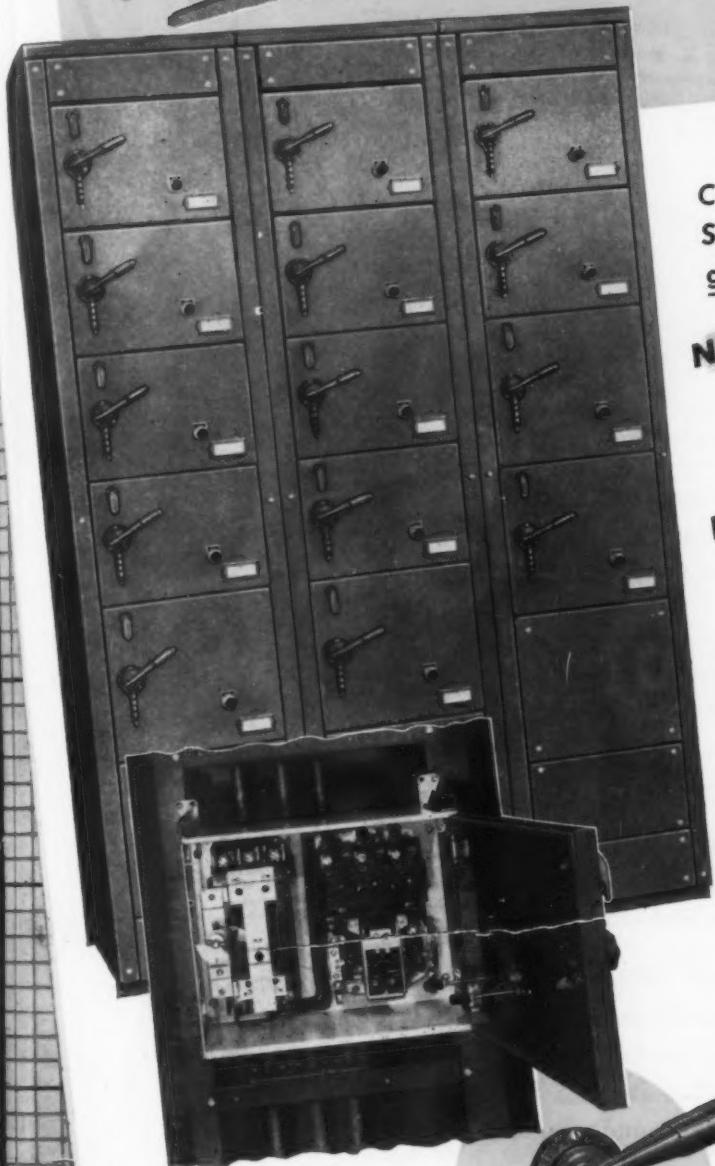
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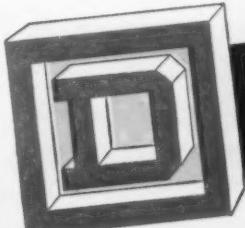
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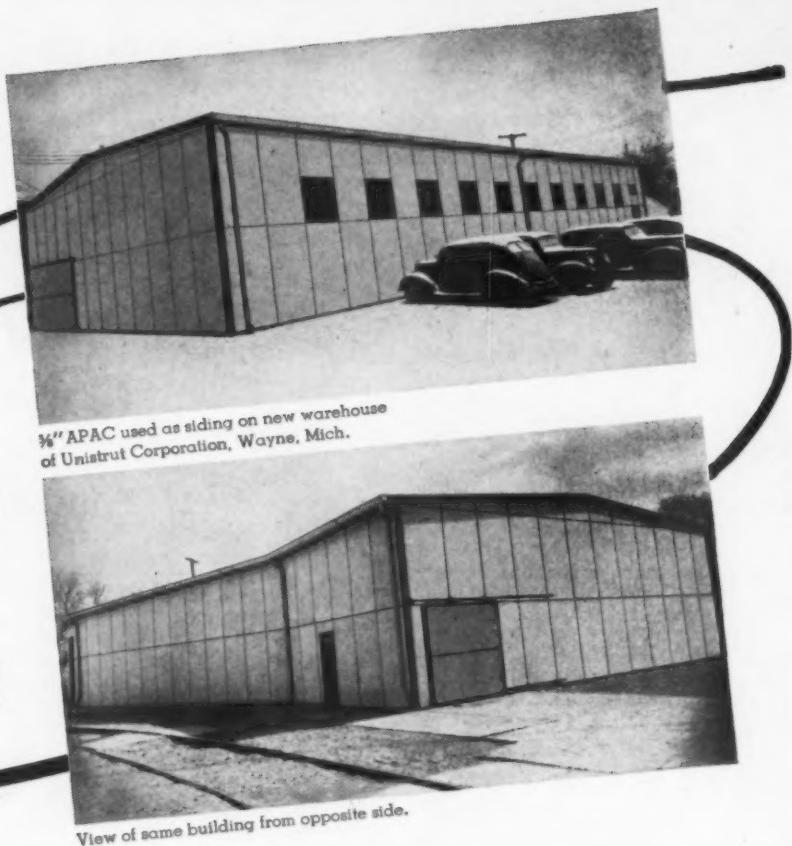
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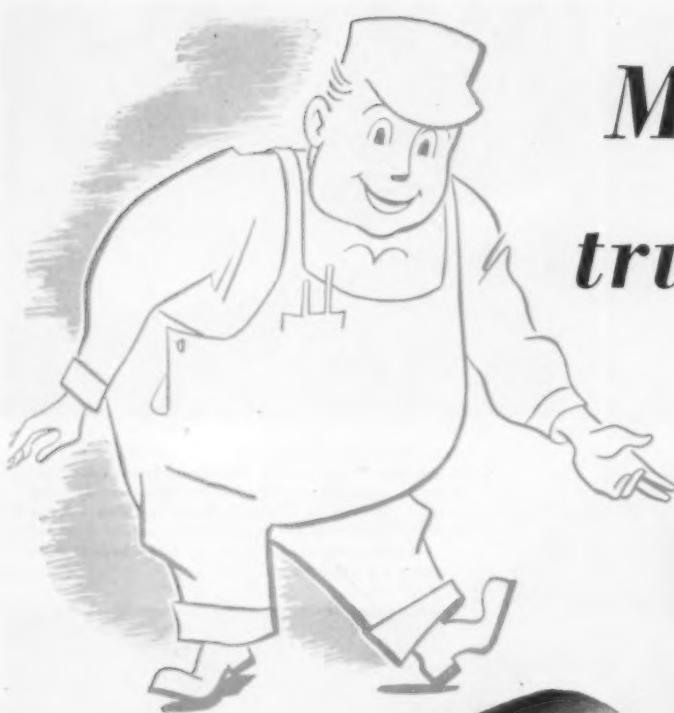
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* * *

Whatever *your* sheet lead requirements, look to the leader to meet them...look to National Lead for top quality sheet in all wanted compositions, gauges, and sizes.

NATIONAL LEAD COMPANY

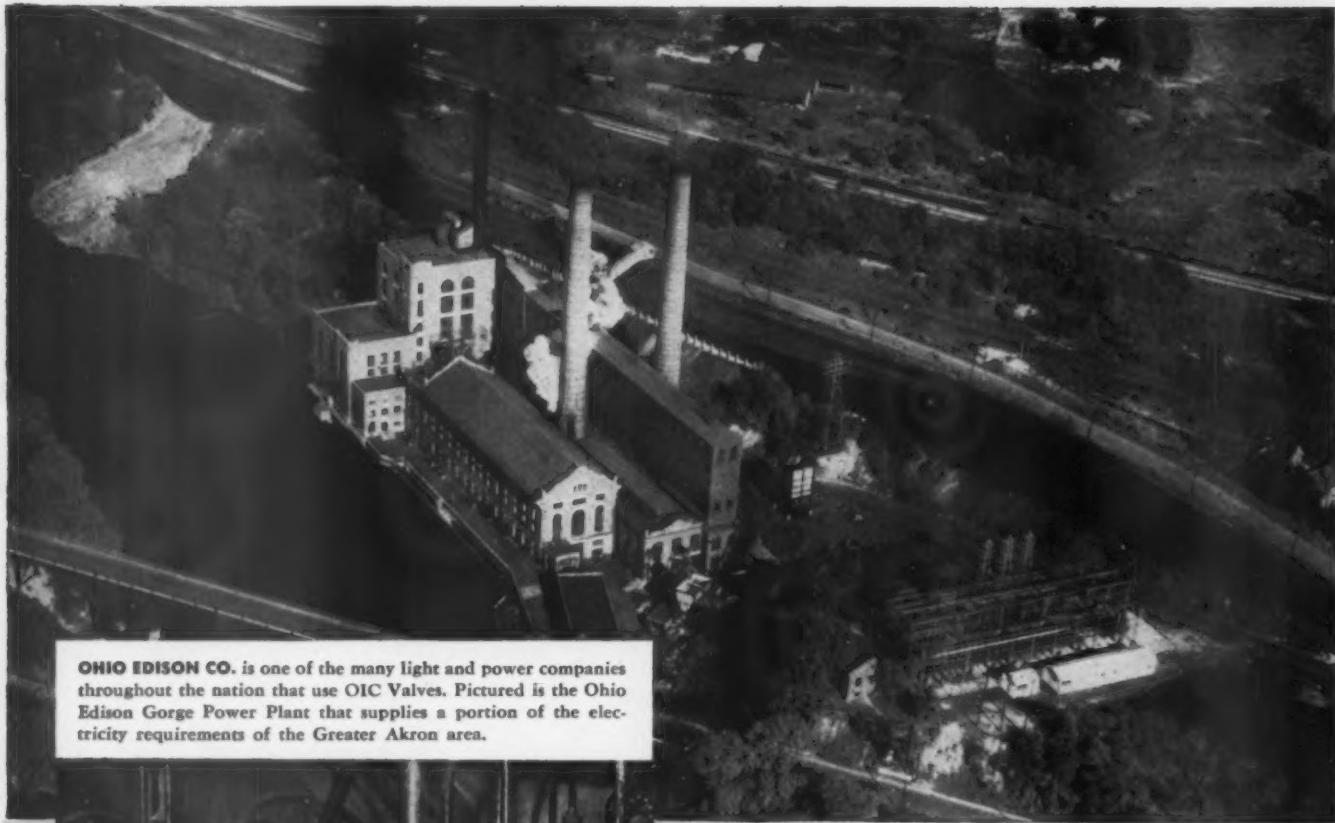


111 Broadway, New York 6, N. Y.

Offices and Plants in Principal Cities

Pacific Coast: Morris P. Kirk & Son, Inc., Los Angeles

Canada: The Canada Metal Company, Ltd., Toronto



OHIO EDISON CO. is one of the many light and power companies throughout the nation that use OIC Valves. Pictured is the Ohio Edison Gorge Power Plant that supplies a portion of the electricity requirements of the Greater Akron area.



OIC
SETS THE PACE
IN VALVES

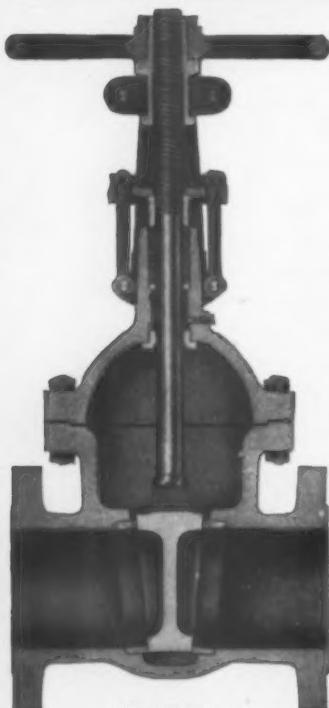
IN THE NATION'S LIGHT AND POWER PLANTS

OIC Valves are the answer to the demands of light and power companies for valves that function with absolute precision and safety for long periods of time. There are good reasons—dozens of pace-setting features that show why OIC Valves are steadily gaining nation-wide preference.

There are no flow obstructions to cause turbulence and pressure drop in OIC Valves. OIC Valves have streamlined, straight-through ports with inner walls as smooth as glass! The heavy I-beam wedge rises entirely clear of the fluid passageway. There are no recesses or pockets between the valve body ports and the seat openings. And OIC Valves are built with rugged strength to withstand the highest pressures. OIC Valves give you extra body-wall thickness . . . precisely calculated flange and gasket dimensions . . . accurate distribution of materials to prevent concentration of stresses in any one part.

OIC Valves save you money by helping you avoid extra pumping. You get *steady* pressure you can depend on! You handle your flow requirements more efficiently—more economically!

Eliminate Change-Over Difficulties with the Handy OIC Cross Reference Chart
Just check the number of the valve that you wish to replace, look in the OIC Cross Reference Chart, and you will find the number of the OIC Valve to replace it. For your free copy, write to *The Ohio Injector Company, Wadsworth, O.*



No. 3002

OIC VALVES

CAST STEEL • FORGED STEEL • IRON • BRONZE

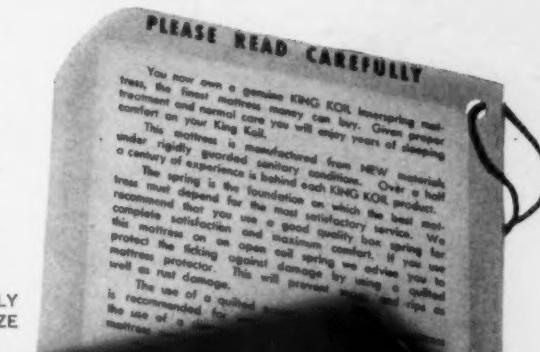
0-549-10

Point-of-sale tags pay their own way!

... and Pay Dividends, too!

This fine booklet tag, for example, works for The United States Bedding Co. It identifies the product — gives instructions for use. It tells customers the merits of King Koil Sleep Products *right at the point of purchase*. Reminds the salesman of selling features.

ILLUSTRATIONS ARE APPROXIMATELY
1/4 ACTUAL SIZE



Think of the self-selling action of these Dennison designed tags! They're always on-the-job. They attract customers' attention. They create confidence in the product. They make sales!

Dennison can build that sort of selling personality into your point-of-sale tags, seals, wraps, bands, merchandise cards, set-up boxes.

Call the nearest Dennison Office or write Dennison Manufacturing Co., Dept. W-79, Framingham, Massachusetts.

LOOK TO **Dennison** FOR EXTRA VALUE IN
MATERIALS • DESIGN • WORKMANSHIP

Here's what they're doing



Copyright 1949
General Electric Co.

New technique for welding chrome pipe



YOU CAN PUT YOUR CONFIDENCE IN . . .

GENERAL  ELECTRIC

g with G-E Stainless Electrodes

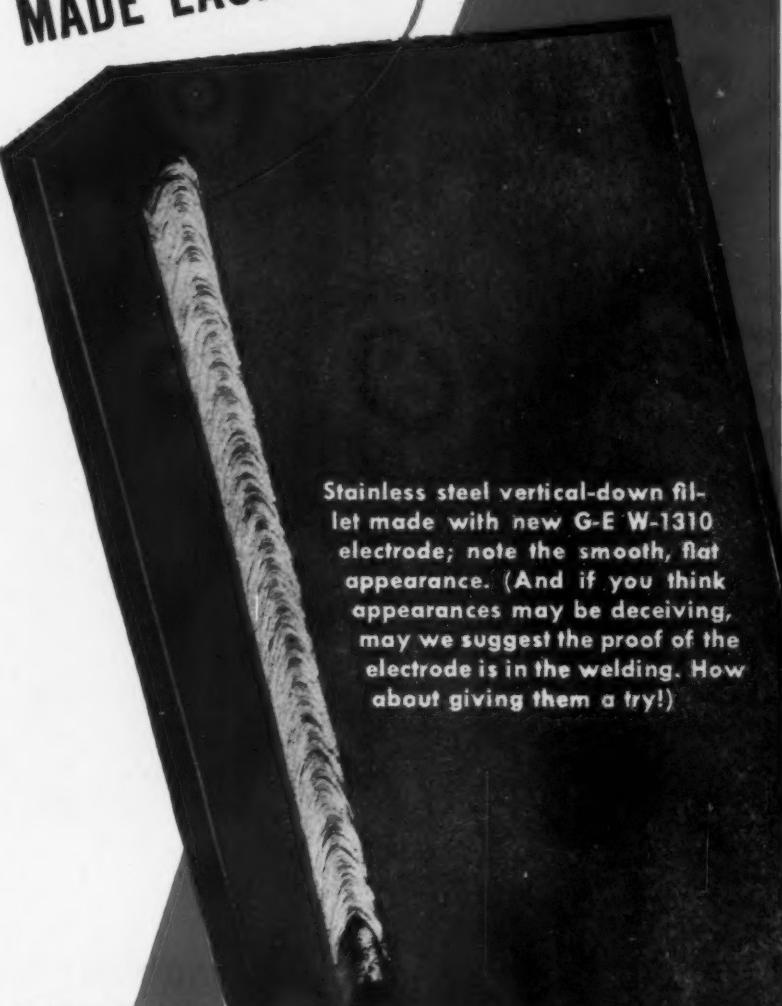
• We've made that old bugaboo, the vertical-down weld, say "Uncle!" with a new coating formula on G-E 1000 series stainless electrodes in the $\frac{1}{8}$ " and smaller sizes. (The 1000 series have a lime-type coating for reverse-polarity d-c welding; there are 16 standard types for welding various analyses of stainless.) Other analyses may be obtained with the new coating composition upon request.

Already endowed with excellent usability characteristics in the vertical and overhead position as well as the horizontal, their new coating makes them particularly well suited for the ordinarily troublesome vertical-down welding.

G-E stainless steel electrodes are regularly demonstrating their versatility and ability to help solve difficult welding problems. Why not investigate them; your General Electric Arc-welding Distributor carries a complete stock, also including eleven types in the 2000 series with a titania-type coating for use on either a-c or d-c.

FOR OTHER WELDING JOBS there are some 40-odd additional types of G-E electrodes including a most complete line of low-hydrogen types, cast-iron, hard-surfacing, and phosphor-bronze electrodes, as well as mild-steel and general-purpose rod for manual or machine welding. Mail the coupon now for a copy of the handy, pocket-sized G-E electrode catalog.

Vertical-down Welding
MADE EASIER



Stainless steel vertical-down fillet made with new G-E W-1310 electrode; note the smooth, flat appearance. (And if you think appearances may be deceiving, may we suggest the proof of the electrode is in the welding. How about giving them a try!)

HAVE YOU SEEN "ARC WELDING AT WORK"? This 30-minute, sound-color motion picture depicts clearly the design and production advantages inherent in the three basic types of arc welding. Ask your G-E Arc-welding Distributor. Mail the coupon to him, or to:

Dept. K712-1, Apparatus Department
General Electric Co., Schenectady 5, N.Y.

Send me bulletin GES-3571, pocket-sized electrode catalog.

Name _____

Company _____

Address _____

City _____ State _____

**ARC WELDERS • ELECTRODES
ACCESSORIES • RENEWAL PARTS**

Now

Sawyer's Protective Wear

includes

NEOPRENE *

*lighterweight, soft,
pliable, will not stick*



Roomy and comfortable . . . and 100% waterproof . . . Sawyer's Lighthouse Brand protective wear is made of NEOPRENE. Tough and pliable under any weather conditions, NEOPRENE is *absolutely not affected by . . . gasoline . . . kerosene . . . vegetable oils . . . mineral oils . . . greases.*

Sawyer's Lighthouse Brand NEOPRENE garments are built for men who treat 'em rough . . . to give top-notch performance through many years of hard usage.

Available in a complete range of sizes, in black or yellow.

*Reg. T. M. of E. I. DuPont deNemours & Co.

- #527—Jacket—Waist length
- #528—Pant—Bib front
- #524—Coat—Three-quarter length
- #552—Hat—Sou'wester—soft style
- #557—Hat—Sou'wester

AND SOMETHING ELSE HAS BEEN ADDED!

Sawyer's LIGHTHOUSE Brand Hycar** Aprons are *brand new!* They're light, they're tough, they resist most acids, and they have no cumbersome reinforcement! Two lightweight styles—#490 (35" x 45") and #495 (29" x 35") — the latter being especially suitable for use by women. The heavier apron—#480 (33" x 46") — has four grommets; the lighter aprons have waist tie tapes only. Tapes go under hem to provide greater strength.

**American Rubber Hycar is a product of B. F. Goodrich Chemical Co.

The H. M. SAWYER & SON COMPANY
CAMBRIDGE, MASSACHUSETTS

SUCCESSFUL GIFT PACKAGE — IN CORRUGATED

At the H & D Package Laboratory, leather and wood and linen patterns are often simulated in corrugated board. Distributors of specialty items, are capitalizing on H & D ingenuity and craftsmanship to sell merchandise. Relatively inexpensive, distinctive in appearance, rugged in construction, these H & D corrugated boxes are a complement to the highest quality products.



PRODUCT
QUALITY
is reflected by
The Package



FAMILY NAME FEATURED in "Look-Alike" Packages

Quick, easy identification and selection are important where the same product is made in several sizes and several models. Automotive parts, for example, win greater dealer acceptance when the packaging plan includes simplicity, legibility and convenience. The H & D boxes shown here effectively display the manufacturer's name, conserve shelf space, give necessary product information, simplify inventory-taking, require no repacking, provide ample product protection.

FLUORESCENT LIGHTS Shipped Safely in CORRUGATED BOXES

A complicated problem of packaging fluorescent fixtures—odd-shaped, bulky, fragile—has been solved with an H & D engineered box which has reduced the entire packing operation to a mere 70 seconds! An ingenious arrangement of six interior pieces of corrugated board provides more than ample protection. The packed product can be stacked and loaded and shipped as safely as any other type of merchandise—thanks to H & D package engineering.



H & D
BOXES

FOR MORE INFORMATION WRITE

HINDE & DAUCH
Authority on Packaging

Executive Offices: 4903 Decatur St., Sandusky, Ohio

FACTORIES IN:

Baltimore 13, Md. • Buffalo 6, N. Y. • Chatham, Ontario
Chicago 32, Illinois • Cleveland 2, Ohio • Detroit 27,
Mich. • Gloucester, N. J. • Hoboken, N. J. • Kekionga
City 19, Kansas • Lenoir, N. C. • Montreal, Quebec
Richmond 12, Va. • St. Louis 15, Mo. • Sandusky, Ohio
Toronto, Ontario • Watertown, Mass.

no more hand-me-downs



s for stainless sheet and strip

Stainless sheet and strip production is coming of age—no longer made on the hand-me-downs of carbon steel production, thanks to modern advances in strip mill practice. CRUCIBLE, drawing on this progress and on generations of *specialty* experience, has carried stainless development even further by building the world's first complete mill designed *specifically* for hot and cold rolling of stainless steels. In this \$18,000,000 project, every building, every piece of equipment, has been built to incorporate the *best* of accepted modern practice, PLUS exclusive features designed by CRUCIBLE's industry-famous technical staff.

Here stainless sheet and strip is produced in widths from $\frac{1}{2}$ " to 50" inclusive, in all gauges, grades and finishes. This new and important contribution to the production of stainless steel is vital news to every processor of stainless steel products. For now CRUCIBLE, one of the pioneers in stainless steels, rounds out an integrated program of stainless in all its forms—sheets, strip, plates, bars, wire, forgings, castings and tubing (manufactured by the new subsidiary, Trent Tube Co.). To this program CRUCIBLE has applied its *specialty product* methods of quality control, methods that have given CRUCIBLE leadership in special purpose steels for half a century. Data sheets for all grades are yours for the asking. Your inquiries will be welcomed.



new tools for a **MASTER** mechanic

CRUCIBLE STEEL COMPANY OF AMERICA

405 Lexington Ave., New York 17, N. Y.

Branches, Warehouses and Distributors in Principal Cities

CRUCIBLE

hot and cold rolled

STAINLESS SHEET AND STRIP

STAINLESS • HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE • STEELS

That's right! POWELL VALVES *really* cut maintenance costs

Every day, *the cost of production* is becoming a more important factor . . . and *maintenance* is a major item.

Take, for example, the cost of maintaining flow control equipment. By installing Valves that are properly designed and made of materials best suited to meet the exacting requirements of the service in which they are to be used, you not only save in the amount of wages paid out to maintenance crews, but you avoid costly shutdowns with consequent loss in production.

To build valves that give longer, trouble-free service has always been and is a prime consideration of Powell Research and Engineering. That's why it pays to standardize on *Powell Dependable Valves*. Ask your nearest Powell Valve Distributor—or write direct.

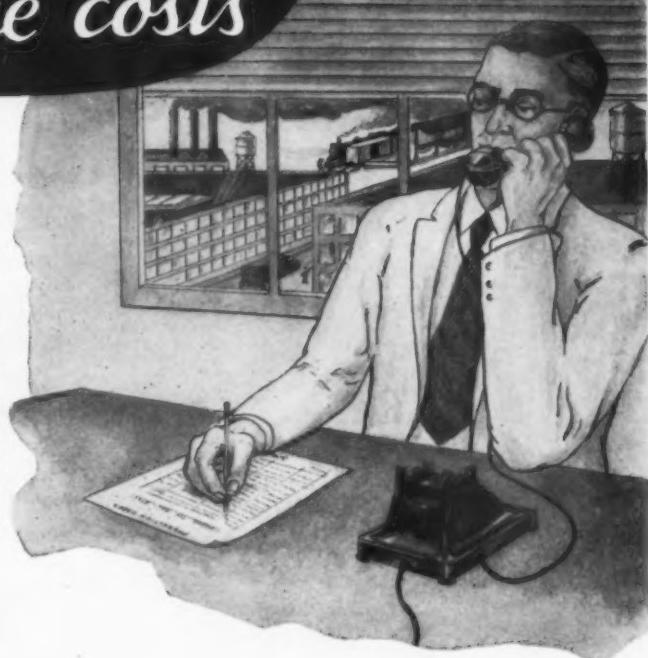
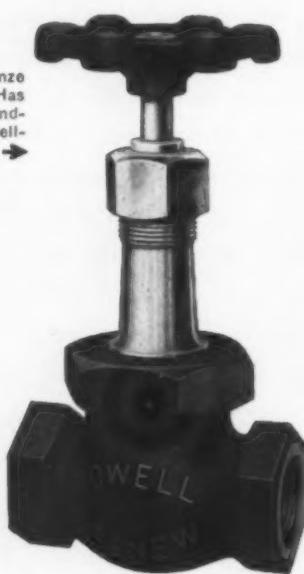


Fig. 190—150-pound Iron Body Bronze Mounted "Irene" Globe Valve. Has screwed ends, union bonnet and regrindable, renewable, wear-resisting "Powellium" nickel-bronze seat and disc. →



Fig. 1708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable, wear-resisting "Powellium" nickel-bronze disc.



Powell Valves are made in Bronze, Iron, Steel and a wide selection of Corrosion-Resistant metals and alloys. Valves of every type—Globe, Angle, Gate, Check, Non-return and Flush Bottom Tank Valves—are included in the Complete Powell Line.



Fig. 560 — 200-pound Bronze Regrinding Horizontal Swing Check Valve. Screwed ends, screwed-on cap and regrindable, renewable bronze disc.



Fig. 375 — 200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable wear-resisting "Powellium" nickel-bronze disc.

The Wm. Powell Co., Cincinnati 22, Ohio
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

Twice the service on a tough chipper drive

Another Goodyear
Performance Record

GOODYEAR INDUSTRIAL RUBBER PRODUCTS
 - Specified COMPASS 50 BELT for
PAPER MILL LOG-CHIPPER DRIVE

The **Compass** belt is bodied with multi-strand cords, spiraled continuously without a splice. Cords on opposite sides of the belt are twisted in opposite directions to insure true running.

FIVE years after it was installed on a log chipper in a leading paper mill, this Goodyear **Compass** 50 belt was still going strong—in spite of high shock loads and impact stresses that “killed” ordinary plied-up belts in under two years.

Service like this is common with **Compass** belts, because of a Goodyear “exclusive”—the **Compass** construction that bodies the belt with strong,

high-tensile cord cables in the load-carrying section. These super-strong muscles let **Compass** belts walk away with loads that ruin ordinary belts—keep them on the job longer—give you lowest-cost service in the long run on belt drives.

Ask the G.T.M.—Goodyear Technical Man—about **Compass** belts for your problem drives. Write him c/o Goodyear, Akron 16, Ohio.

ASK ABOUT THESE OTHER GOODYEAR PRODUCTS

ORTAC HOSE—for air, water, mild acid, gasoline, distillates and oil—the first almost-universal hose for smaller plants

V-BELTS—there's a Goodyear construction to meet every type of drive problem—give longer, better service

CONVEYOR BELTS—from cross-country giants to small load carriers inside your plant, Goodyear builds the belt you need

Compass, Ortac—T.M.'s The Goodyear Tire & Rubber Company

GOOD YEAR

THE GREATEST NAME IN RUBBER

The solution to many an ENIGMA



A field force of factory-trained SPRING SPECIALISTS provides ready help and close contact with any of our divisions

THE BEST
SEVEN SOURCES

FOR
MECHANICAL
SPRINGS

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BARNES
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**DUNBAR
BROTHERS
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**OHIO
DIVISION**
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DAYTON, OHIO

**THE
WALLACE
BARNES
COMPANY LTD.**
HAMILTON, ONT.
CANADA

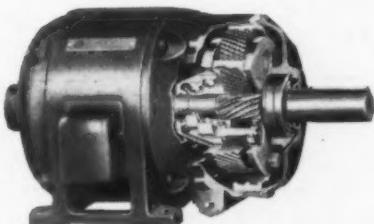
U. S. DIVISIONS OF
ASSOCIATED SPRING CORPORATION
AND CANADIAN AFFILIATE

Want Additional Product Information? See Page 19.

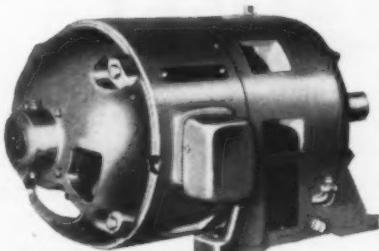
Buy **TRI CLAD** Gear Motors

when? **NOW!**
how? . . . **FROM STOCK!**

*9 strategic locations
throughout the country
assure you of Fast Delivery*



Single-reduction unit, speeds down to 155 rpm.



Double-reduction unit, speeds down to 13.5 rpm.

Most popular Tri-Clad gear-motor ratings, from 1 to 15 hp, are available right off warehouse shelves.

Look at what you get—the industry proved Tri-Clad induction motor for low-speed drives. Extra load carrying capacity in a smaller space than conventional gears because General Electric's planetary gear system gives you an additional 1:1 ratio of reduction. You get easier mounting in a smaller space, more motor protection with Tri-Clad gear-motors.

You'll find that standard G-E gear-motors fill the bill for most low-speed drives. Where special requirements must be met, G-E engineers can build you a gear-motor engineered to your specifications.

Call your nearest General Electric sales office—or General Electric Distributor now for **FAST SERVICE** on all your gear-motor requirements. **Apparatus Dept., General Electric Company, Schenectady 5, N. Y.**

GENERAL ELECTRIC





HOW'S YOUR BUSINESS ... STILL?

NOT your business, of course! But you'd be surprised how many businesses are **STILL** out in the bushes, progress-wise...and thoroughly fortified against the approach of any "suspicious persons" who might want to do business with them.

That's a good guarantee of a private, one-man "recession" *any* time. And, in touchy times, not a few fall (unwittingly) into this type of so-called business thinking.

But Bristol, for 99 years now, has

kept its business thinking young... extroverted... directed outward... *on the selling side*. And we use our guns to go out and *get* business, rather than stay home and *fight* it off.

The Bristol arsenal, what's more, is in better fighting shape than ever, with a lot of new equipment in the mills... including *continuous casting*.

Now if you are ready, willing and able to do business as we are... let's *get together*. And let's show you how Bristol Brass sheet, rod and wire can

give *your* products a new forward drive to new markets and profits. Let's not sit **STILL**. Let's *get going!*

THE
BRISTOL BRASS
CORPORATION

Makers of Brass since 1850, Bristol, Conn.

15 Park Row, New York City
418 Frick Building, Pittsburgh, Pennsylvania
1607 South Broadway, Dayton, Ohio
703 Temple Building, Rochester, New York
538 Hospital Trust Bldg., Providence, Rhode Island



JOIN THE TREND TO TOP PERFORMANCE



Preformed
"Blue Center"
Wire Rope

A FIRST SPECIFICATION AMONG PLANT MEN

WHEN YOU PULL DOWN COSTS these days it's something to brag about. And with Preformed "Blue Center" Wire Rope you can cut costs to the minimum.

"Blue Center" Steel—made only by Roebling—provides shock resisting

stamina and toughness. The Preforming process—improved and perfected—simplifies installation, reduces whipping and vibration, improves winding. It is not inclined to twist and kink . . . is easy to handle and install . . . can be cut without seizing. This combination of

advantages gives unsurpassed life and serviceability.

Roebling Wire Rope is one of the best-known products in industry today. There's a type and size for every kind of service. Have your Roebling Field Man suggest the *one* rope best adapted to your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

— WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST —
ROEBLING OFFICE AND WAREHOUSE

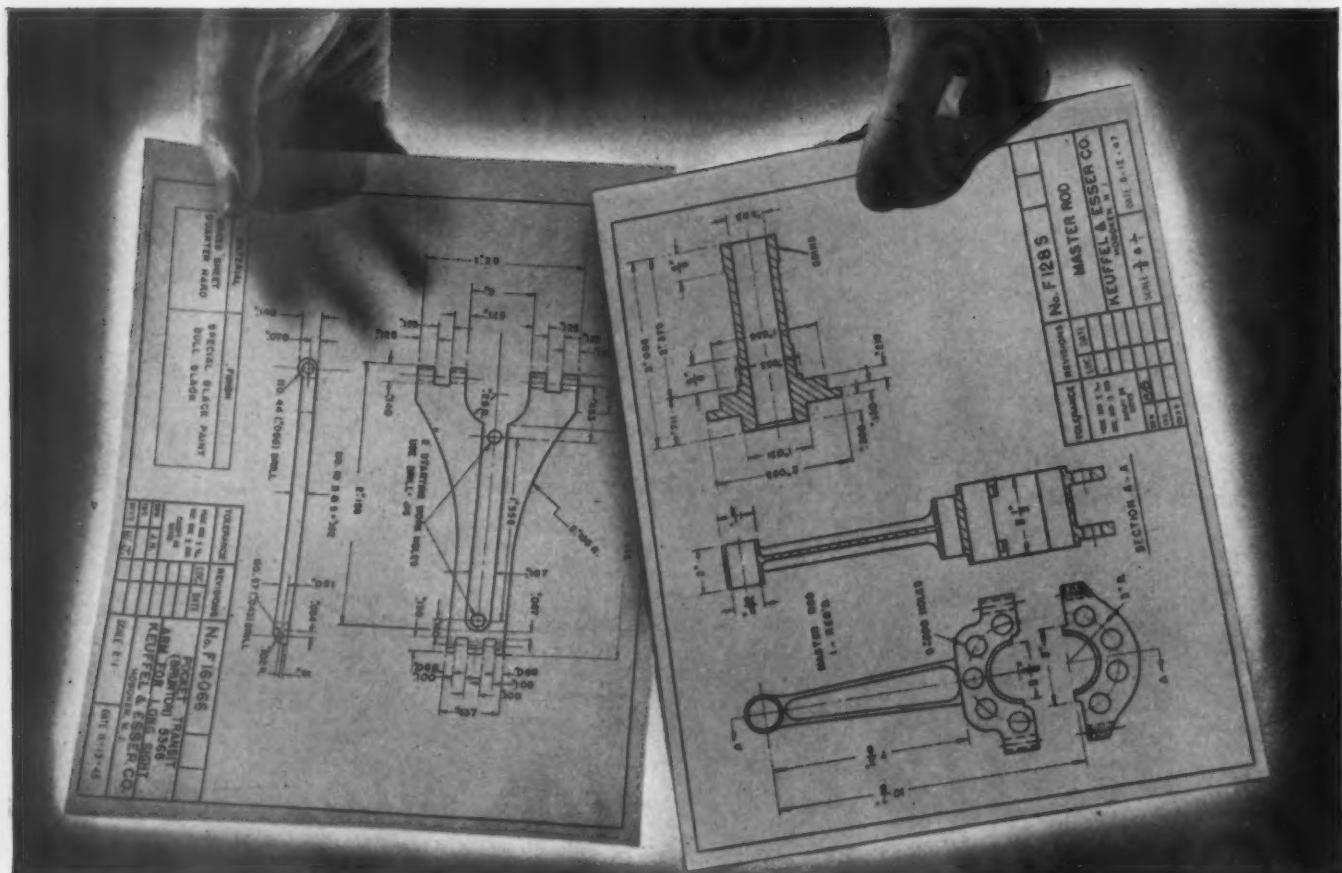
Atlanta, 934 Avon Ave. ★ Boston, 51 Sleeper St. ★ Chicago, 5525 W. Roosevelt Rd. ★ Cleveland, 701 St. Clair Ave., N. E. ★ Denver, 1635 17th St. ★ Houston, 6216 Navigation Blvd. ★ Los Angeles, 216 S. Alameda St. ★ New York, 19 Rector St. ★ Philadelphia, 12 S. 12th St. ★ Pittsburgh, 855 W. North Ave. ★ Portland, Ore., 1032 N. W. 14th Ave. ★ San Francisco, 1740 17th St. ★ Seattle, 900 First Ave.

ROEBLING
★ A CENTURY OF CONFIDENCE ★



partners

For 82 years K&E equipment and materials have been



ONLY HELIOS* DRY DEVELOPING MATERIALS GIVE YOU:

K&E QUALITY. Trusted by draftsmen and engineers for 82 years.

K&E DEPENDABILITY. Your best assurance of consistent results in making positive line prints.

Only when you use dependable materials can you get consistent results in making positive line prints.

To be sure of absolute K&E standards in the color-forming components required for these dry diazo products, we established a new plant where we manufacture HELIOS materials exclusively. We not only

control and make the finished materials, but actually manufacture, from the raw materials, the image-forming chemical components as well. Thus HELIOS papers, cloths and films are the product of 82 years of K&E experience and K&E insistence on quality first.

HELIOS dry developed materials cover a wide field of reproduction needs. They consist of opaque papers (black, blue and maroon line) and opaque cloth for working prints, besides transparent papers and cloth and clear and matte films, for intermediate originals (to use instead of originals).

in creating . . .

partners of the draftsman, the engineer and the scientist in shaping the modern world

For samples and full information about the HELIOS line and what it can do for you, ask any K&E Dealer or Branch or write us here in Hoboken, N. J.

PARAGON* DRAFTING MACHINES TAKE WASTE MOTION OUT OF DRAWING

The PARAGON Drafting Machine combines T-Square, triangles, protractor and scales, all in one single unit, controlled entirely by one hand. The scales glide into any position on the board. The lightest touch rotates them to the angle desired. You can draw all lines to exact length.

The design of the PARAGON Drafting Machine assures permanent accuracy. The open center arm construction makes it practically impossible to disturb the band tension, which is properly set at the factory and needs no further adjustment.

Let your K&E Dealer or Branch demonstrate this machine or write for full description to Keuffel & Esser Co., Hoboken, N. J.



LEROY* LETTERING AND SYMBOL DRAWING IS UNIFORM AND QUICK

LEROY lettering and symbol drawing need no special skill or training. LEROY equipment offers a wide variety of alphabets and sizes, including Regular Gothic, Reversed, Condensed, Extended and Outline Gothic, Cheltenham, Greek, Isometric alphabets and ellipses, Electrical, Map and Welding symbols.

K&E can make special LEROY templates with your own words, phrases, designs, symbols or trade marks.

Ask your K&E Dealer or any K&E Branch for a demonstration or write to K&E, Hoboken, N. J. for the LEROY Booklet.

*Trade Mark®



KEUFFEL & ESSER CO.

EST. 1847

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CHICAGO • ST. LOUIS • DETROIT • SAN FRANCISCO
LOS ANGELES • MONTREAL

INSUROK

by RICHARDSON

Dependable names in plastics

UNDIVIDED RESPONSIBILITY

Many users of plastics enjoy Richardson's VARIETY of products and services. They like the convenience of handing all of their plastics problems to one organization. More important, they like for Richardson to assume complete responsibility for their plastics requirements.

Such an arrangement is possible with Richardson because here, from one company, you can get (1) Laminated INSUROK in a wide variety of grades suitable for virtually every plastic laminate requirement (2) complete punching facilities (3) complete fabricating facilities (4)

complete molding facilities (5) experienced engineering (6) complete laboratory facilities if your job calls for laboratory research (7) mold and die design and facilities to produce molds and dies and (8) conscientious, personal attention to your particular needs.

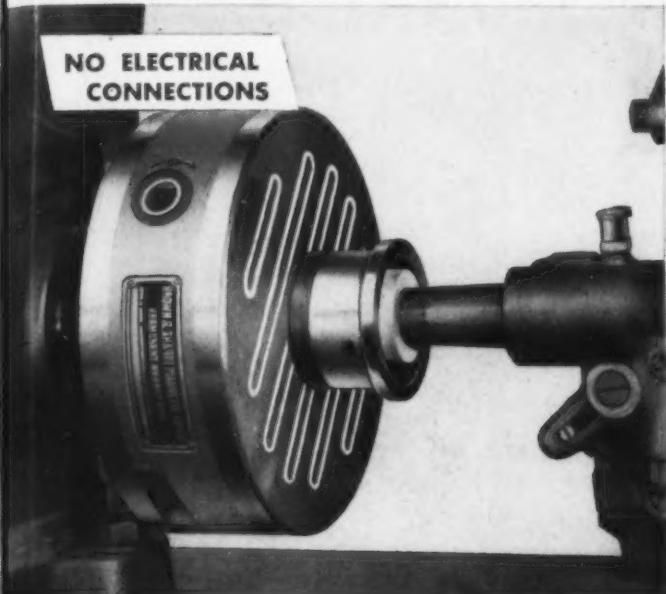
Why not see what this variety of products and services can do for you? Send a set of specifications today and learn, without obligation, how Richardson would approach your job . . . find out for yourself how Richardson's "undivided responsibility" can work to your advantage.

INSUROK is a registered
trade-mark of
The Richardson Company

The RICHARDSON COMPANY
GENERAL OFFICES: LOCKLAND, OHIO FOUNDED IN 1858
Sales Headquarters: MELROSE PARK, ILLINOIS

CLEVELAND - DETROIT - INDIANAPOLIS - MILWAUKEE - NEW BRUNSWICK, (N.J.) - NEW YORK - PHILADELPHIA - ROCHESTER - ST. LOUIS

Powerful Permanent Magnet Chucks



ECONOMY FEATURES

NO INSTALLATION COSTS
NO OPERATING COSTS
PORTABLE • ADAPTABLE
SAFE • LONG-LIFE
SIMPLE TO USE

that simplify layout work,
testing, inspecting, grinding
and light machine operations

Wherever these Brown & Sharpe permanent magnet chucks are in use, time-consuming holding jobs are made easy — economical. By a simple turn of a lever, work is held securely — another turn releases work instantly. The amount of holding power may be varied to permit accurate positioning of work.

With these chucks, no jigs or fixtures are needed. No clamps. No vises. No risk of distorting work through uneven pressure. The chucks are portable . . . instantly usable . . . and will hold work as long as desired without damage to work or chuck because they do not heat. Used for wet or dry grinding.

WIDE RANGE OF TYPES AND SIZES

Brown & Sharpe Permanent Magnet Chucks are available as follows:

RECTANGULAR MODELS, 8 sizes, to 12 $\frac{1}{2}$ " x 36".
ROTARY MODELS, 3 sizes — diameters — 5", 7", 9".

Also available . . . auxiliary top plates, magnetic chuck parallels, magnetic blocks with V or plain face and other useful holding aids.

For sale only in the United States of America and its Territories. Write for Catalog describing operating principles and specifications. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

BROWN & SHARPE



6 OPERATIONS ELIMINATED

*when they changed to
Carpenter Stainless Tubing...*



Sanitary parts for water coolers cost less to make now that Carpenter Stainless Tubing is used to provide the durability that reduces servicing costs.

This job is exceptional, but it shows what *can* happen to unit costs when you make use of Carpenter's experience with Stainless Tubing.

Unit costs were way out of line and rejects were piling up on the floor when this water cooler part was made from sheet. Seven operations were required on each part. Silver soldering of finished units was practically impossible because the fabricated material would not satisfactorily withstand high temperatures.

Now, water cooler parts are fabricated in one reverse bending operation from Type 304 Carpenter Stainless Tubing. Six operations, ranging from the slitting of sheet to the annealing of fabricated parts, have been eliminated and the soldering of assemblies is a snap.

To find ways to save time and reduce unit costs on your own jobs, put our Stainless Tubing experience to work. It will cost you nothing and may save you plenty.

THE CARPENTER STEEL CO.

Alloy Tube Division • 122 Springfield Road • Union, N. J.

NEW FILE FOLDER OF DATA ABOUT STAINLESS TUBING

For useful information about physical properties, heat resistance characteristics, standard sizes, etc., write on your company letterhead and ask for the 12-page Carpenter Stainless Tubing Data File Folder.



Carpenter

STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"



24-Hour Service On Your Orders . . .

You get definite delivery information within 24 hours when you call your Carpenter Stainless Tubing Distributor.

THAT
"Something Extra"
 YOU GET IN
CONTINENTAL
 CUTTING TOOLS



CONTINENTAL'S engineering knowledge is an important extra you get in Continental cutting tools. Continental's 30 years' experience as designer and manufacturer of a wide range of cutting tools is your assurance of correct design, exactness of manufacture, and greater accuracy and production in operation. Continental products include counterbores, face milling cutters, broaches, and special carbide-tipped tools. Continental can help you raise your production and reduce your unit costs. Call your local representative, or write Ex-Cell-O in Detroit today!



CONTINENTAL TOOL WORKS
 DIVISION OF EX-CELL-O CORPORATION

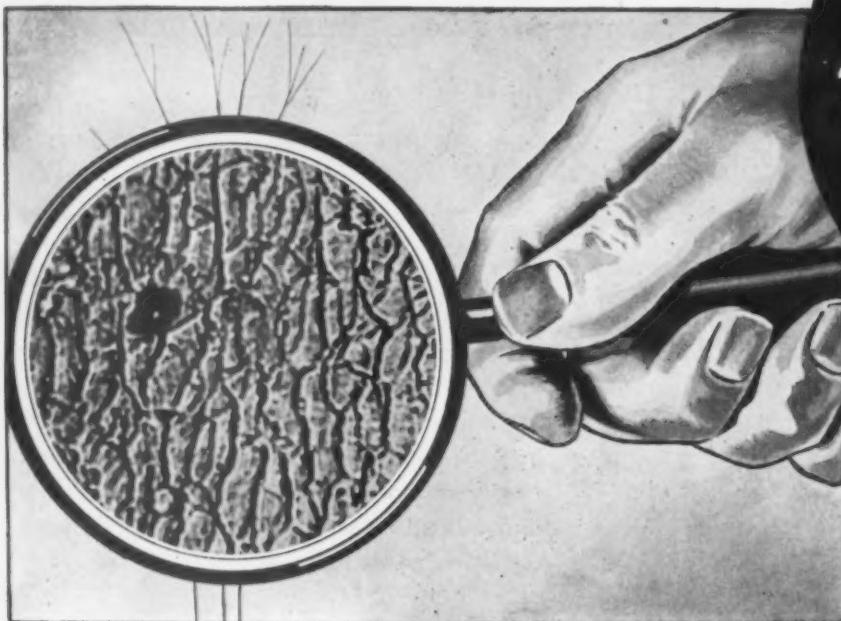
DETROIT 32, MICHIGAN

40-4



Test your Brush I.Q.

No. 3 in a Series



How do paint brushes "carry" paint?

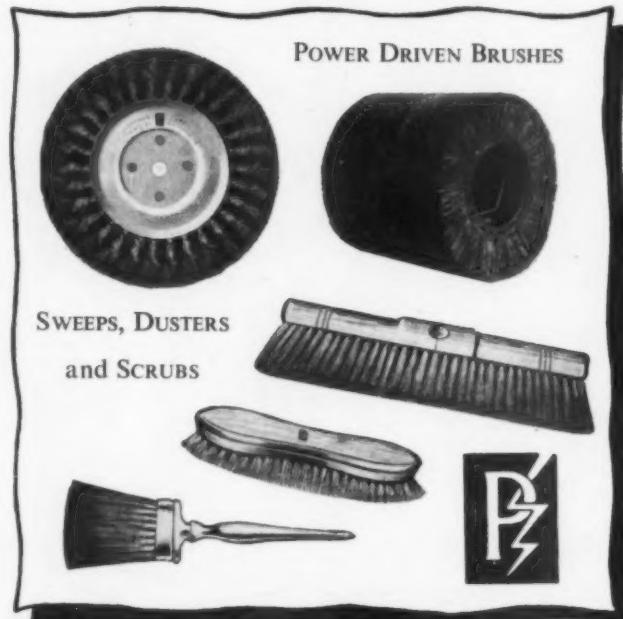
By capillary attraction. The bristle, when enlarged under a microscope, shows a scaley substance extending the entire length of each bristle. The combination of scale and the natural split ends, or "flags" of the bristle, give it capacity, or the ability to carry paint.

PITTSBURGH— Produces the Most Complete Brush Line in the Industry!

Painting . . . In Pittsburgh you have a source upon which you can always depend. Whether it's Gold Stripe, Neoceta or Nylon, you can be sure of top quality, rugged construction and lasting service. And for economy in these days of rising costs, better try the Pittsburgh Neoceta Brushes.

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Overloads...
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Whitney Roller Chain
Keeps Right on
PRODUCING



Records prove the unusual ability of Whitney Roller Chains to withstand shock loads without breakage. A case in point is the following application:—

The head rig drive to the large nine foot Sumner Band Mill at Universal Box Company Ltd. incorporates 3 strand, 1½" pitch, Triplex Whitney Roller Chains for positive transmission of power from the 300 HP synchronous motor. Despite surges in power up to 650 HP (or 350 HP overloads) during the cut run, Whitney Chains withstand these tremendous overloads and are performing day in and day out without failure. In addition to absorbing shock loads, Whitney Chains transmit full rated horsepower without slippage or friction loss. They deliver constant power smoothly and efficiently . . . stand up under the toughest of operating conditions. Write for information.

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- Long operating life
- Constant uniform speeds
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Division of Whitney-Hanson Industries Inc.

207 Hamilton Street, Hartford 2, Connecticut

AO 5X138 GLOVE—Steel stapling includes
(1) Index finger to crotch of thumb (2)
Second, third and fourth fingers to palm
(3) Thumb patch. All seams on face of
glove steel sewed. 4 inch gauntlet.



3 Handy Handfuls
of Steel-Stapled
SERVICEABILITY



AO 1201 HAND GUARD — In foundries,
steel mills and where rough material is
handled, this light, comfortable Hand Guard
is a "natural." It can be put on and removed
in a jiffy and when worn over light-weight
gloves gives them added life. Open back,
well protected thumb. Leather patch steel-
stapled to palm provides added reinforce-
ment.

AO 1674 MITTEN — There's DOUBLE
the wear from this reversible mitten which
may be worn on either hand. All seams
steel sewed.

The 5X138 Glove, 1674
Mitten and 1201 Hand Pad shown, are
typical of the AO line of Steel-Stapled
products for handling rough stock such
as steel sheet, scrap, wheel castings, etc.
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makes them almost as tough as the
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offer everything possible for flexibility
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cowhide. Your nearest AO Safety Rep-
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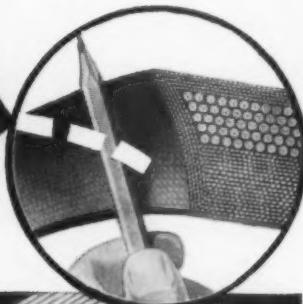
That the

CONCAVE SIDE

(U. S. Patent No. 1813698)

SAVES Transmission DOLLARS

You can actually feel
the sides of a belt change shape
as the belt bends.



When a straight-sided V-Belt bends around a pulley, three things are bound to happen.

(1) The top of the belt, being under tension, narrows. (2) The body of the belt, under compression, widens. (3) The sides of the belt bulge out.

These shape changes are inevitable. They are shown in figures 1 and 1-A, below.



Fig. 1
Straight-Sided
V-Belt.



Fig. 1-A
How Straight-Sided
V-Belt Bulges
in Sheave-Groove.

Because this bulging belt does not fit the sheave groove, two facts become clear. (1) The belt will get excessive wear where it bulges—shorter life! (2) The whole side of the belt cannot uniformly grip the pulley—a loss in drive efficiency.

How different the V-Belt with the precisely engineered concave side (U.S. Patent No. 1813698)—the Gates Vulco Rope. As this belt bends it assumes a shape that exactly fits the sheave groove. (Figures 2 and 2-A, below.)



Fig. 2
Gates Vulco Rope
with Concave Side.



Fig. 2-A
No Side Bulge.
Precise Fit
in Sheave-Groove.

Two savings result. (1) The Gates Vulco Rope wears evenly—longer life! It's entire side-wall grips the pulley—no slip—full delivery of power!



REG. U. S. PAT. OFF.

The Mark of SPECIALIZED Research

The Concave Side is MORE IMPORTANT NOW Than Ever Before

Because the sides of a V-Belt are what actually drive the pulley it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley directly through the belt's sidewalls.

Now that Gates SPECIALIZED Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side is naturally more important in conserving belt life today than ever before.

498

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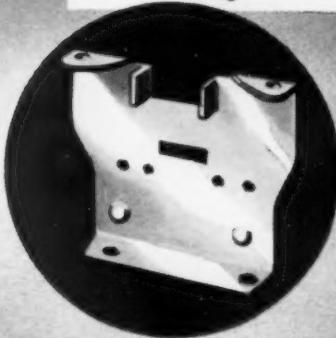
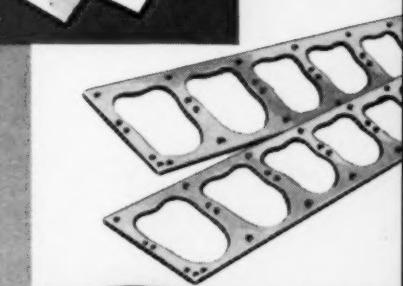
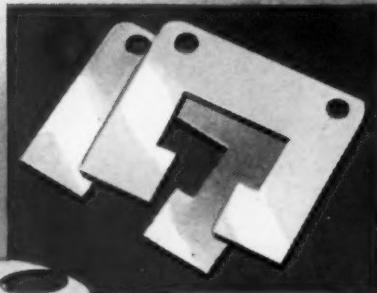
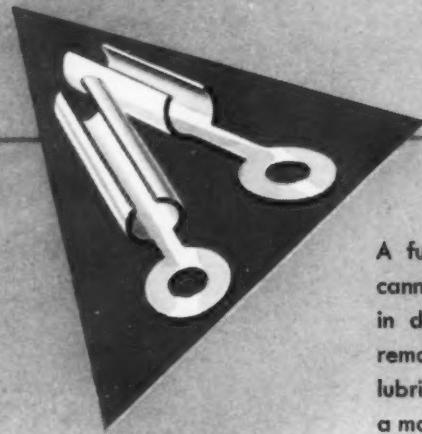
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WEIRTON, W. VA., Sales Offices in Principal Cities

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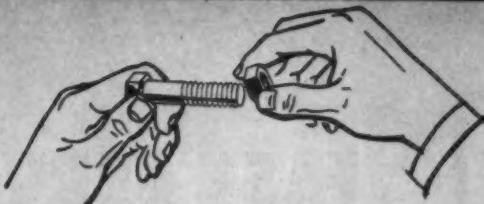
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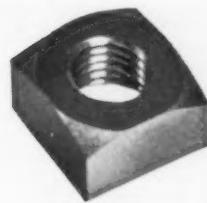
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STUDS

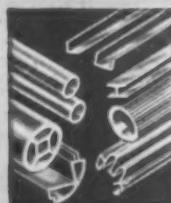
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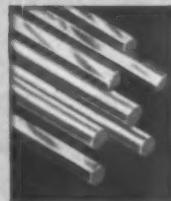
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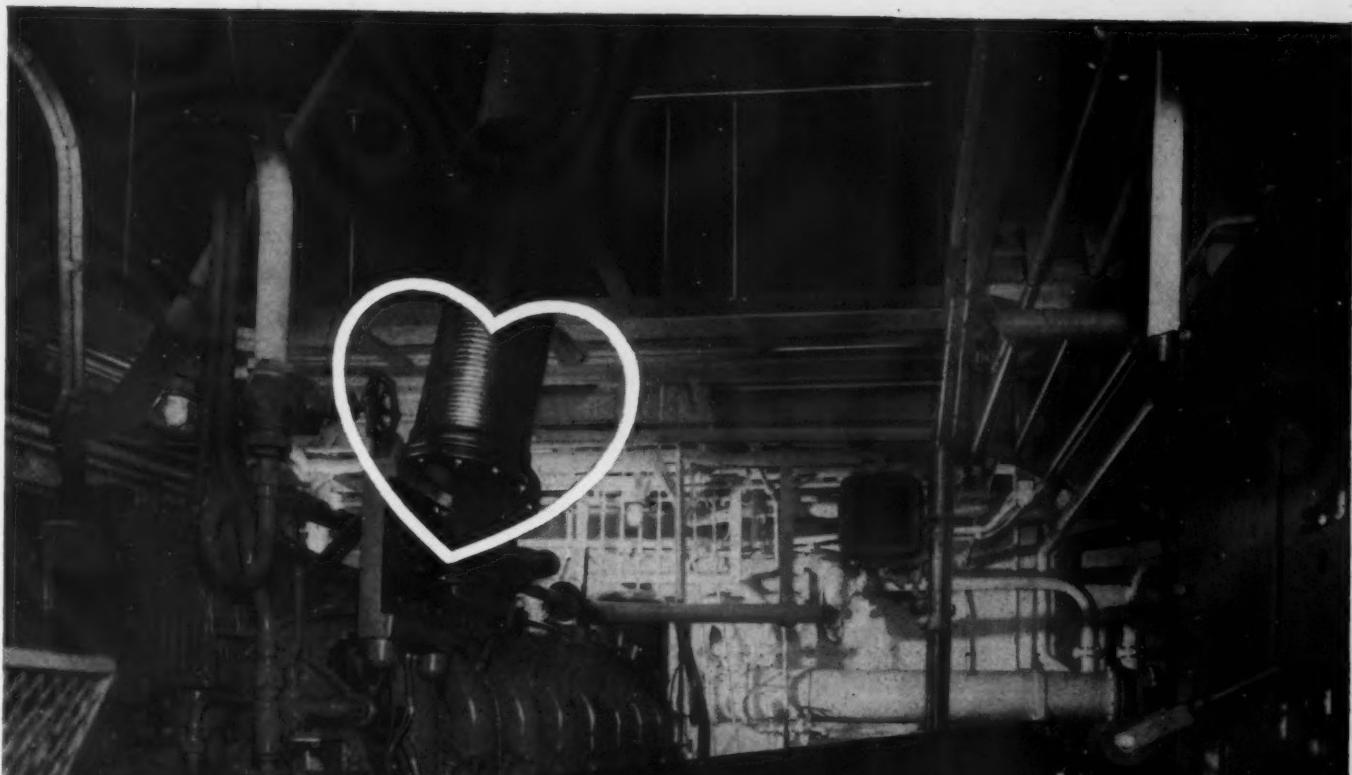
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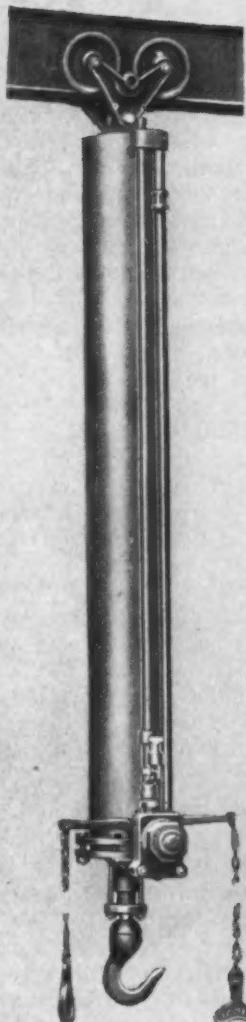


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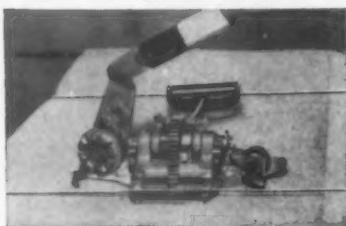
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It's a simple matter to get taut, pilfer-proof bundles with Gerrard Round Steel Strapping. Between the small T A model and the semi-automatic Q model, there's a Gerrard machine to fit your needs. Shown is model L K for cartons, boxes, crates from 75 to 300 pounds.



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Gerrard Round Steel Straps secure loaded wooden cases to a pallet for easy handling. Palletizing reduces handling costs . . . and the use of Gerrard Steel Strapping cuts material costs 30% to 50% lower than any other metal reinforcement.



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STEEL STRAPPING**

UNITED STATES STEEL

F.O.B. *filosofy of buying*

WHAT constitutes "small business" is still a moot question, but the Munitions Board concedes a slight error in classification when, in a recent report on the awarding of contracts it listed among the small business concerns such minor enterprises as Dupont, Armour, Swift, Firestone, Endicott-Johnson, and the American Steel & Wire Company. Hereafter, the matter is to be clarified by requiring bidders to specify the number of their employees—1 to 499 (small) or 500 or more (large). Incidentally, the report shows that small business firms received 71.8% of the orders, representing 28.5% of the dollar volume of Munitions Board business.

purchasing agent—Miss Ruth Kramer, of Marion, Ohio—who was elected and installed as President for 1949-1951.

SOME of the quotations received under a system of competitive bidding make a purchasing agent wonder what constitutes a "right price". If the bids are all alike, there is a strong presumption that competition hasn't entered into the picture at all. But what is he to think when there's a spread of 380% from the low to the high bid? That's what happened when the City P. A. at Lawrence, Mass., opened bids for a school painting job. Six companies offered proposals, respectively, of \$825, \$1,200, \$1,800, \$2,400, \$2450.37, and \$3,050. Which would you choose? This particular set of quotations is unusually interesting in the almost uniform differential of \$600 all along the line. The one bidder who apparently sharpened his pencil and figured costs out to two decimal places came out next to the top. As for the high bid—well, it could be mere coincidence, but the mayor had set up a tentative appropriation of \$3,150 for the project.

POSSIBILITIES of group purchasing are being explored by at least two important units in the transport field—the American Trucking Associations and the Air Transport Association. Legal complications are being studied in both cases, as anti-trust laws appear to be the biggest hurdle. Keen appreciation of the importance and potential benefits of better buying are reflected in a comment by C. V. Doolittle, Purchasing Agent of the Great Southern Trucking Company, Jacksonville, Fla., at a recent meeting of the Accounting Committee of ATA: "I believe this field is unlimited—there being no end to the savings possible after we once set up a program to follow."

If there is any lingering doubt as to the advantages, or even the economic necessity of standardization, take a look at the chaos in the phonograph record industry, which is currently offering discs for operation at 78, 45, and 33 rpm. The smoldering controversy over the failure of leading record manufacturers to get together on a standard speed for the long-playing records, flared into the open at the July convention of the National Association of Music Merchants in New York City, but without much success in resolving manufacturers' policies. Meanwhile, several millions of owners of record playing equipment are sitting tight with their old machines pending the settlement of the dis-

pute. Here is a case where a sound technical improvement that was rushed prematurely to market for temporary competitive advantage is losing a large share of that market for want of that simple ingredient that American users expect and demand—a common standard. Some 90 manufacturers of records and players are said to be involved, and the economic waste that will be entailed when a standard rpm is adopted, as eventually and inevitably it must be, is appalling to contemplate.

• •

PRICING policies and terms in the processed food industry are barometric because, while some other industries can afford to wait out a market, distribution of these semi-perishable products depends on dealer support in brand acceptance and maintenance of "floor stocks". It is significant, therefore, that these manufacturers have returned to the prewar 30-day price guarantee on distributors' stocks, and have doubled the cash discount rate, from 1% to 2%.

• •

ADD to the list of purchasing agent hobbies, which have been reported from time to time in this column, a thriving little business known as the Birdie-Brush Mfg. Co., with general offices at 1539 Nelson Avenue, Toledo, Ohio. That's the home address of William Fournier, Purchasing Agent of the American Floor Surfacing Machine Company. The general offices of Birdie-Brush, as well as the production line and shipping department, are on the dining room table. It started when our P.A. tossed a pair of muddy golf shoes into a closet one not-so-fine August afternoon, and was properly censured. Thinking things over, he saw that the main difficulty in cleaning golf shoes was getting around the spikes. He devised a little gadget in the shape of a golf ball, made of plastic. The two halves unscrew. On one side is an aluminum spike to clean the cleats; the other side is fitted with a stiff-bristle nylon brush that takes care of suede shoes, hat, and clothes. Production started last December. Output is currently running at about 2,000 per week, at \$1 apiece, and the backlog of orders is three weeks ahead of production.



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LONGER LIFE; because Preforming helps to keep it free from internal stress, reduces twisting and turning in the groove—thus cutting down both internal and external wear.

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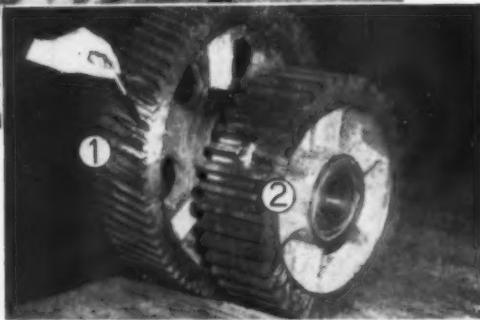
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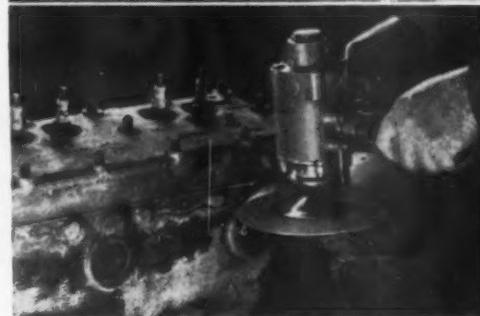
1. The excess metal-deposit on this job was removed by a 7"x 3/16"-24 grit disc.
2. A broken-tooth prior to welding and smoothing.



Bayflex discs are unexcelled for smoothing welds . . . they outperform the ordinary coated abrasive disc 40 to 1 or better.



Preparation of cracks before welding . . . a typical application. Discs will fit all standard right angle head grinders and sanders, air or electric.



Top Performance Consistently Duplicated

Want Additional Product Information? See Page 19.

PURCHASING

Purchasing Previews



A Washington Report for Purchasing Agents

September 1, 1949.

ADMINISTRATION EXPECTS BUSINESS PICKUP THIS YEAR . . .

It is now anticipated that the trend toward liquidation of inventories will reverse itself during the last half of this year, and that in the process, industrial activity and employment will show a marked improvement.

This view is held most strongly in the Department of Commerce. It is also significant that Secretary of Commerce Charles Sawyer, as well as the Secretary of Treasury John Snyder, have convinced the Administration that the so-called inventory recession will be cured toward the end of this year.

By accepting this view, the Government is committed to hold off on the numerous depression stop-gap measures which were used during the 1930's, and which are being pressed by some sources now. At the same time, it is felt by Government officials that preparation should be made to resort to large-scale Federal aid if the optimistic forecasts do not develop this year.

An inter-departmental Government committee has been established to study the economic trends, and to recommend steps which could be taken to alleviate unemployment in local areas.

Major unemployment problem is in New England and in California, with some spotty areas of unemployment in sections of the industrial east and southeast, and isolated cases in the midwest.

FACTORS UNDERLYING RECOVERY HOPES . . .

Optimism over a recovery by late fall or winter is based on two factors.

The first is that if the recession is primarily due to liquidation of inventory, the rate of sales to consumers will tend to force a correction when inventories have been worked down to a level where skimpy stocks discourage buying.

Second factor is that in many consumer lines, wholesalers and retailers have been holding off in anticipation of a lower level of prices. The merchandisers have watched raw material price trends very closely, and where it appeared that price corrections were likely, have worked off inventories to a minimum level. This has been true in the non-ferrous metal fields, and also in woolens.

It is reasoned that once the lower prices have stabilized, merchandisers will build up their inventories to normal levels.

"FOURTH ROUND" COMPLICATIONS . . .

Complicating factor is the current drive by the CIO for a fourth round of wage increases. As has been the case in each of the three previous postwar drives for higher wages, the CIO contends that the wage boost is needed to bolster consumer purchasing power.

At the same time, it appears almost futile to expect significant price reductions in a period of wage increase. The higher wage levels will tend to stiffen prices, and this will in turn discourage efforts to increase the volume of sales.

The result will reflect doubly in the unit cost of production, on the one hand through higher labor costs, and then because of a declining rate of output.

DIFFICULT TO ESTIMATE INVENTORY LIQUIDATION . . .

While there has been considerable speculation over the extent to which inventories have been liquidated, it appears that in specific lines, the liquidation has been substantial.

In terms of dollar volume, the overall trend for the first three months of this year was for inventories to level off. During the second quarter, the dollar volume of inventories dropped considerably. However, it is expected that at some point during the latter half of the year, buying for inventory will be resumed.

It is difficult to translate this dollar volume trend into actual physical volume of goods, but it is generally assumed that while the inventory liquidation has not been quite as heavy in terms of physical volume as it has been in terms of dollar volume, the extent of physical liquidation has been considerable.

Growing use of the "LIFO" (last in, first out) method of inventory estimates has made it more difficult to compute the extent to which there has been liquidation of inventory. The "LIFO" method would, at this stage, tend to conceal the extent of physical liquidation, because it would show sales on a current price basis, rather than on the basis of acquisition costs.

CONSTRUCTION AT VERY HIGH LEVELS . . .

Significantly, while industrial employment has fallen off, construction, both industrial and home, has been very high.

The trend in construction has been contrary to most expectation. It had generally been assumed that housing construction would fall off sharply, and that industrial construction would also fall off.

In the field of housing, new starts at the outset of this year were low, but rose sharply through the late spring and summer months to a point where during some months it equalled the record levels of 1948.

At the same time, expenditures on new plant and equipment continued through the first half of this year at the peak rate which has been characteristic of the postwar period.

It is now anticipated that there will be a moderate decline in plant and equipment expenditures in the latter part of this year to a level about 4% less than the rate for the same period last year.

TRENDS IN GOVERNMENT HOUSING . . .

In view of the strength of the construction industry, there is considerable speculation over the effect of the new housing legislation, which provides for construction of 810,000 low-rent public housing units during the next six years.

The home construction industry differs concerning the impact of this program on contractors who might otherwise consider going into lower cost home construction. Some factors in the industry maintain that the number of public houses involved is negligible, and that Government red tape will tend further to water down the whole program.

On the other extreme is the view that by establishing a program under which the Government is going into home building on a limited scale, there will be an opening wedge for expansion of the program if private construction falls off to a degree where Government construction activities dominate the market.

ONE KIT DOES THREE JOBS!

1 DRIVES and REMOVES nuts, bolts, cap screws up to $\frac{3}{8}$ " thread size. Hammers frozen, stubborn fastenings loose with thousands of powerful blows per minute.

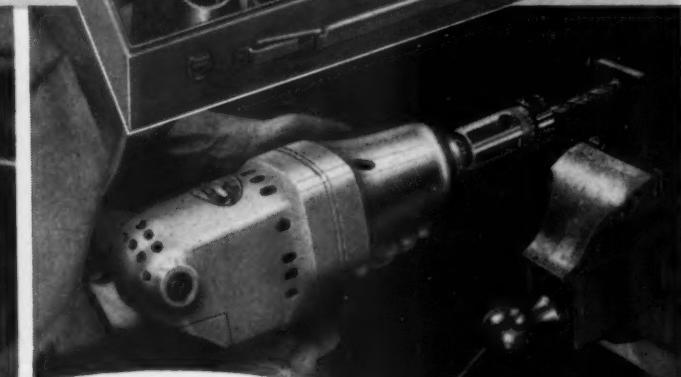
2 DRILLS holes in a jiffy up to $\frac{1}{2}$ " diameter in steel.

3 TAPS holes with thread sizes from No. 10-32 to $\frac{1}{2}$ "-13.

SCREWDRIVING and STUD REMOVING attachments available at slight extra cost. The ideal Kit for maintenance and repair work!

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(As Illustrated)



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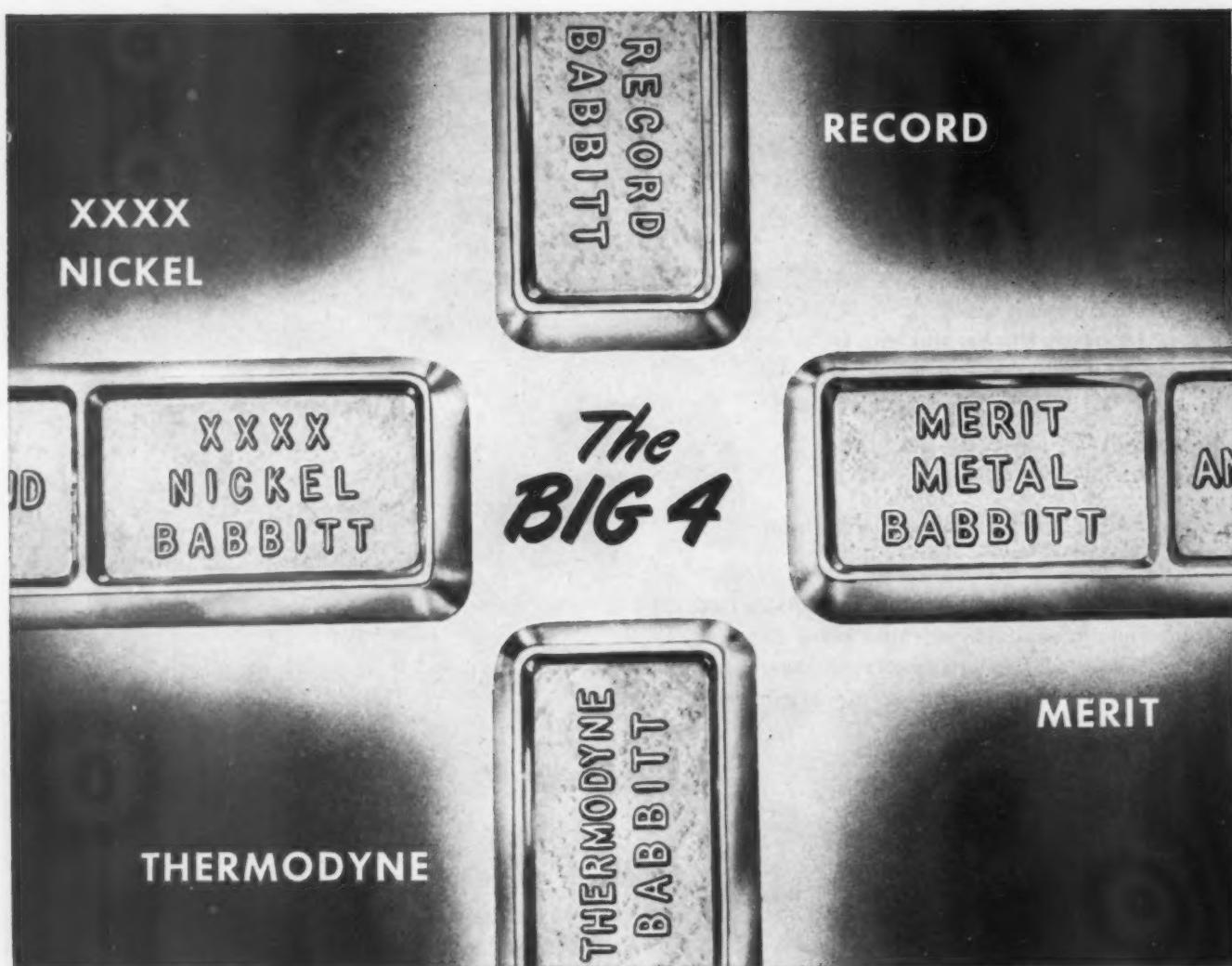
Includes powerful, lightweight Black & Decker $\frac{3}{8}$ " Electric Impact Wrench, with $\frac{1}{2}$ " square drive shank • Chuck for Drilling and Tapping, complete with open-end wrench and hex-key • 6 Hexagon sockets, sizes from $\frac{1}{4}$ " to $\frac{3}{8}$ " across flats • Sturdy convenient all-steel carrying Kit.

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Thermodyne and XXXX Nickel are tough, dense-grained tin-base babbitts for heavy bearing loads at high speed operation.

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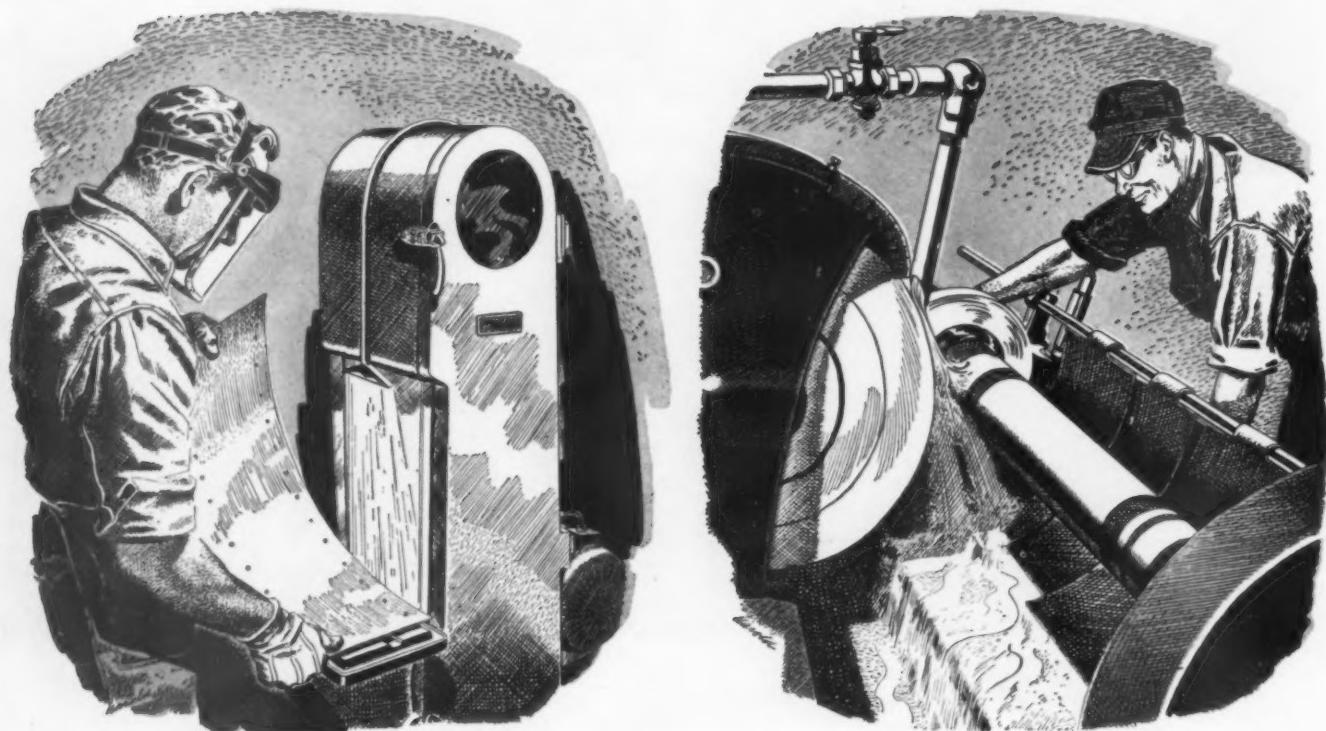
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Catalog No. 11

A note on Abrasives

How Quality Control serves you every production hour



You can use and replace grinding wheel after grinding wheel... belt after belt... or disc after disc—depending upon the requirements of your work—and be sure that each replacement will continue to provide the same standards of abrasive performance. Your production continues on schedule.

These are the direct results of Quality Control in the production of abrasives

by CARBORUNDUM. This control covers every step in the production of grain and the processing of belts, wheels, discs, and other abrasive products.

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in each abrasive tool. Because of our quality control, bonded or coated abrasives can be specified more exactly... and reordered, with confidence of dependable performance.

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The only complete line of Abrasive Tools is

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Engineering News

ON ABRASIVE PRODUCTS



EFFECTIVENESS OF BACKSTAND BELT GRINDING

Used by a steadily increasing number of industrial plants and buffing and plating shops, the backstand belt grinding method offers practical production advantages and economies. It is particularly effective on operations ranging from rather heavy stock removal to the final polishing of surfaces preparatory to buffing. Consistently better finishes are obtained through the use of factory-coated abrasive belts. Units of work are completed in less time. The percentage of machine down-time is extremely low. This increased efficiency has led to a 25% to 100% conversion to the belt backstand technique in plants which formerly used set-up wheels headed with abrasive grain.



V20 BOND SEGMENTS

New V20 segments now make available a fast, cool, free-cutting abrasive for efficient, economical surface grinding applications. V20 segments are structurally uniform throughout; they perform with the same effectiveness during their entire life.

Because of their high degree of uniformity of structure, V20 segments incorporate greatly improved size holding characteristics and make possible the production of closely controlled surface finishes.

V20 segments offer the following advantages not found in competitive types of segments.

1. Cool and free-cutting qualities promote efficient production of burn-free finishes and close tolerances.
2. Uniform cutting qualities of V20 segments make possible close control of part size and finish and the establishment of controlled production rates.
3. Fast rates of cut obtained through the use of V20 segments save many dollars per year in operator and machine time on heavy production work.
4. More nearly self-dressing than other types, V20 segments offer savings in dressing time and usable abrasive.
5. Ability to grind a wide range of work of all sizes with larger table loads makes the surface grinder a more useful, efficient and profitable tool.
6. Successful use of V20 segments on nearly all types of metals including non-ferrous types makes possible reduced inventories in terms of gradings necessary for various types of work.
7. One grading can be used to grind a variety of materials successfully making it unnecessary to change segments when changing work thereby saving set-up time.



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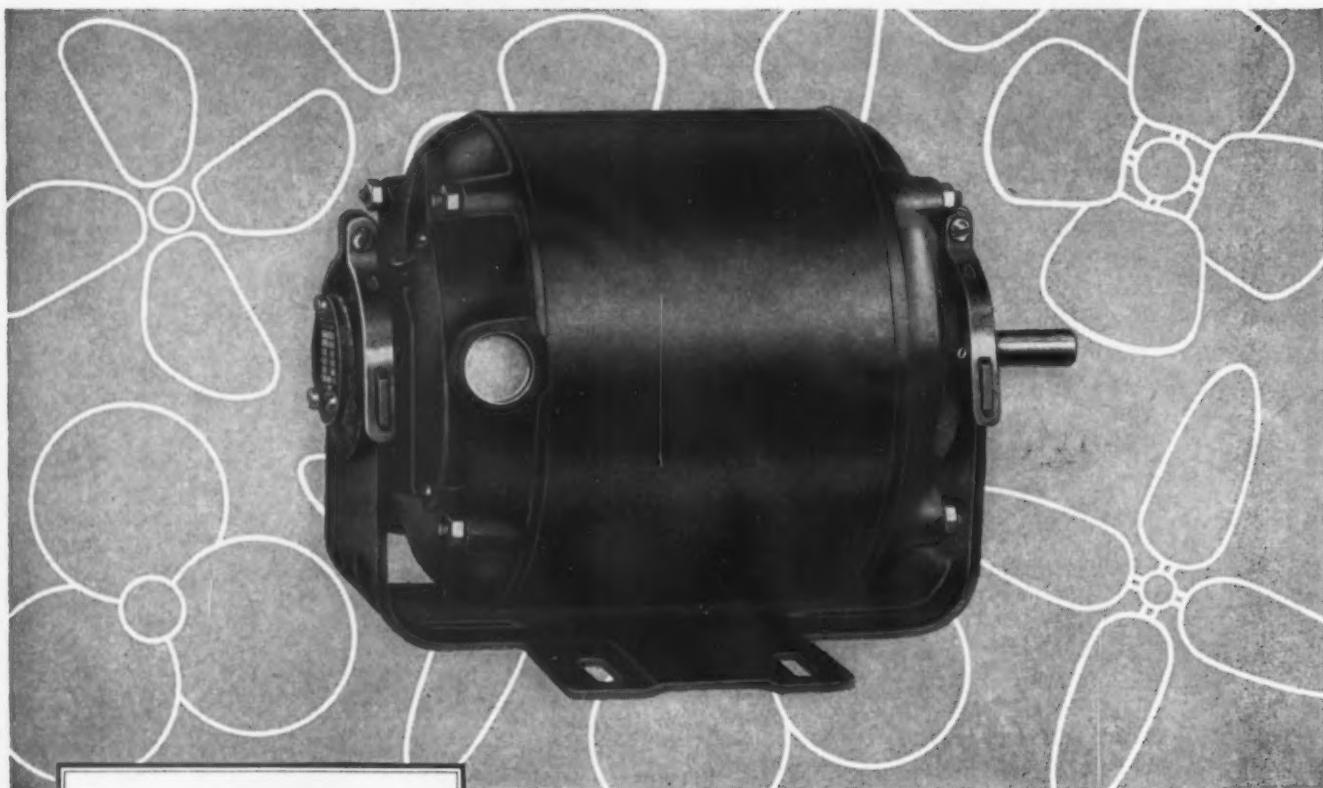
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on applications with
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Split-phase Blower Motors
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Investigate the advantages of this new line of 1/6, 1/4 and 1/3 h.p. blower motors specifically designed for driving furnace blowers and similar types of air moving equipment.

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This airgun is accurate within a $\frac{3}{4}$ " bulls-eye on a 20' test range. It is powered by a hardened piston which, in only a 2" stroke, develops enough energy to slam a .22 cal. pellet through a $\frac{3}{8}$ " pine board.

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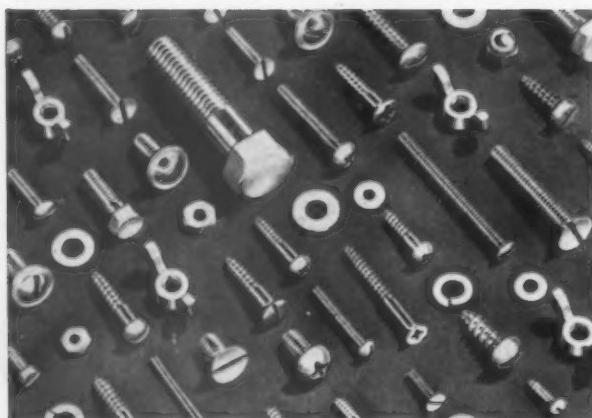


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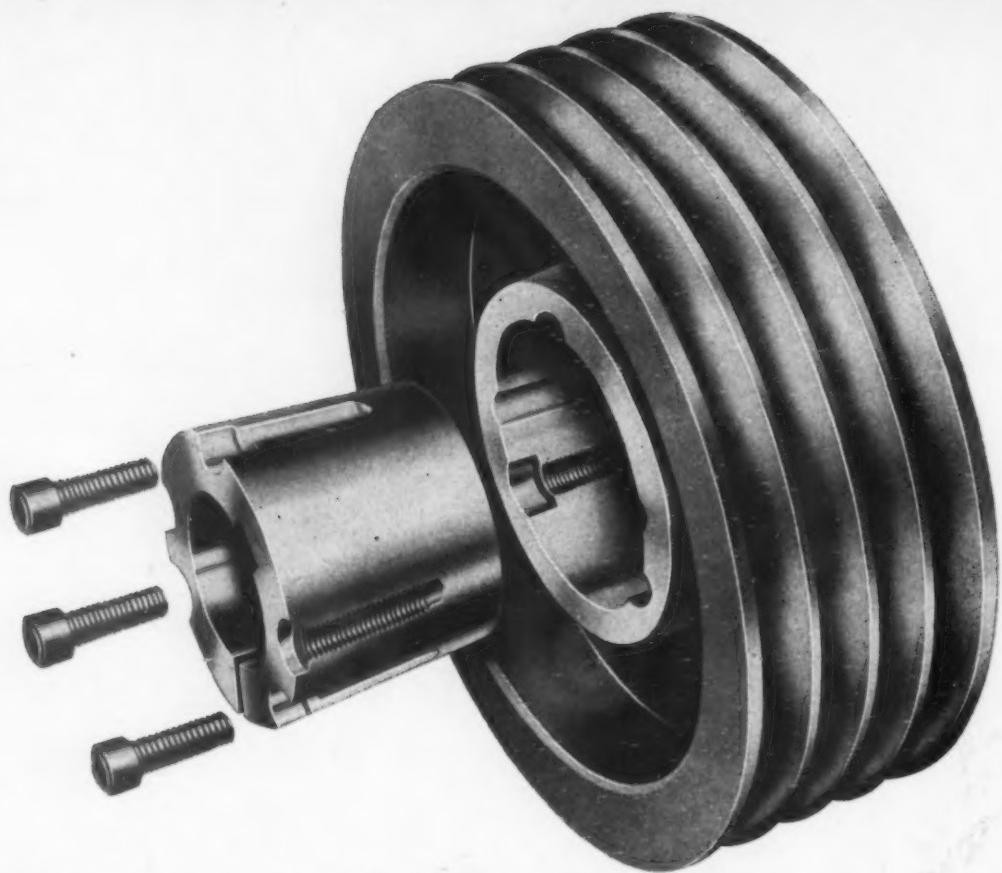
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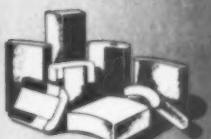
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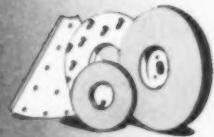
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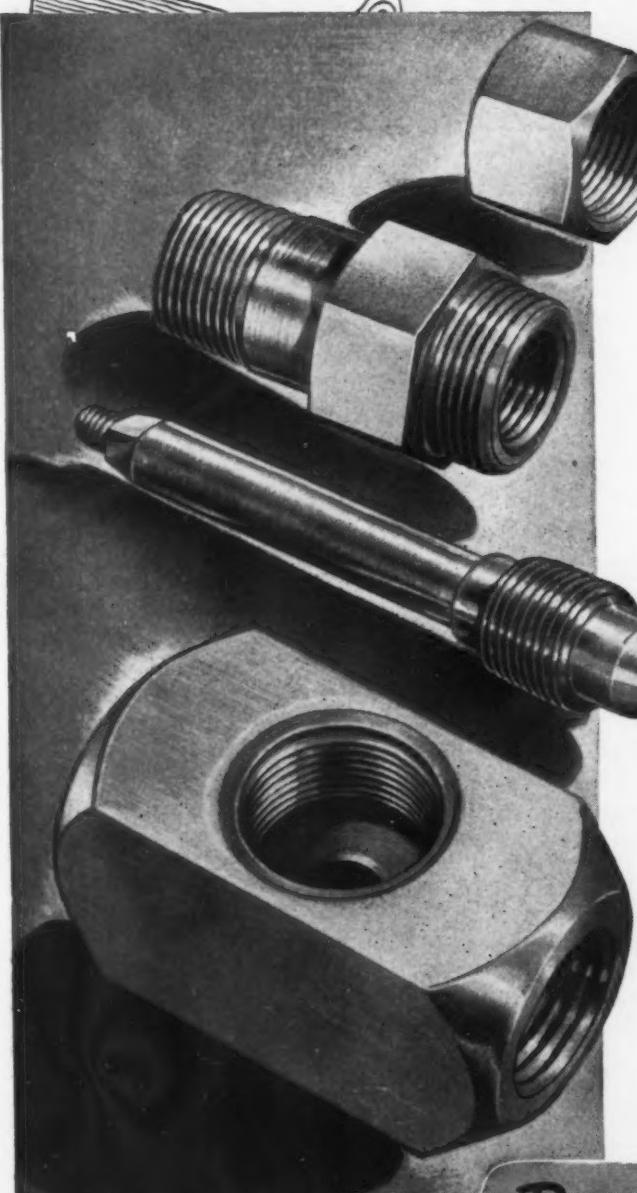
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PURCHASING

The National Magazine of Industrial Procurement

SEPTEMBER, 1949

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WRIGHT EQUIPMENT is used in many new buildings at Caterpillar Tractor Co., Peoria, Illinois. Shown here are 3 of 10 Wright Speedway No. 2 Frame Electric Hoists on one of "Caterpillar's" scraper assembly lines.

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What Goes Up . . .

PURCHASING AGENTS who were careful during the long price upswing to write into their contracts escalator clauses that would work both ways are now reaping the benefit of those clauses in downward price adjustments on the decline. The two-way feature in such contracts is the essence of equity. Conceding the need for flexibility to meet changing conditions, it does not follow that change will always be in the same direction. Purchasing Agents, and sellers too, while recognizing the high costs of a year ago, were not convinced that they were permanently built into the price structure, and their contracts were phrased accordingly.

In other fields, the turn has not been accepted with equal grace. Auto workers who wrote a significant chapter of industrial history by an escalator wage clause tied to living costs, were happy on the upward swing, but are repudiating the plan as the decline in living cost indices is reflected in the wage formula. The principle of equity is tossed out the window.

Increased Federal taxation and budgets that were justified by economic and wartime emergencies are similarly reluctant to yield to the fact that those conditions are of the past. Each change is merely tagged as a new emergency to perpetuate and even extend the extraordinary power and excessive costs of government. Within the past few weeks we have had the amazing pronouncement that we are still in a state of war, to support a program of aid to our erstwhile foes and of preparedness against our erstwhile allies. "Emergency" has turned out to be a very flexible term.

Such tactics contribute nothing to national stability or security. They are sapping the very strength that we shall need when a real emergency arises. They are destroying our capacity for orderly adjustment at the same time they are creating a more drastic imbalance that must be corrected. The persistent lack of realism, frankness, and sound economic thinking is our greatest national emergency today.

Stuart F. Henry



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It is surprising how many well-equipped modern plants still cling to wasteful hand truck methods for moving materials. Every year hundreds of these plants become "Mobilized"—always with the same result. When Mobilift goes to work executives are amazed at the permanent economies which show up.

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IGHLIGHTS

A brief summary of outstanding features of timely interest and importance in this issue, to conserve the time of busy readers



Should **Production Engineering** come under the Purchasing Department? Perhaps not as a general rule, but the answer is Yes in the unique operating policy in effect at the Ferguson implement plant, as told in the article on page 90. This successful enterprise, with purchases and sales amounting to millions of dollars annually, is based on the principle of outside manufacture to strict specification of company designed parts as accessories and for assembly—a vast subcontracting operation where procurement is the key function, embodying the vital elements of scheduling, production and quality control and final responsibility for all costs. You will find this story a stimulating revelation of the potential role of the purchasing department in management.

This month's Survey of Purchasing Opinion touches upon a problem of unusual interest and current importance in our national life—the place of **Small Business** in the industrial economy. Purchasing agents bring to this problem a fresh and significant viewpoint, looking at the smaller enterprise as a source of supply in competition with other sources, and evaluating its contribution to the over-all business scene. Turn to the report on page 97, and compare the replies with your own opinions on this situation.

Successful business administration, whether for the company as a whole or in directing the activities of a department, calls for **Delegation of Authority**, that experience and leadership may be developed. On page 101, the executive head of a large and successful corporation tells how an effective organization is built from the bottom up.

Industrial and economic progress present major difficulties when there is complete dependence on **Foreign Sources of Supply** in the procurement of raw materials and fuel. The Puerto Rican government has embarked on a long range coordinated plan for the development of power resources, control of imports, materials and prices. Purchasing has an important place in the plan, which is described on page 110 from first-hand observation by our Washington editor.

Much interest has been aroused by the recent presentation of **Purchasing Manuals** in these pages. On page 107 are some practical suggestions on how to go about the compilation of such a manual.

This month's **Guest Editorial** (page 89) is contributed by N. J. Gibbins, who has just completed a successful term as Vice President of District No. 4, N.A.P.A. His theme is the importance of building good business relationships and the vital part that the Purchasing Agent can have in accomplishing this.

Good purchasing doesn't stop with procurement, for satisfactory performance and service life of equipment depends also on an adequate **Maintenance Program**. Richard Irmriter outlines such a program for washroom fixtures in the article on page 131.

The science of purchase has progressed a long way since the early discussions of the subject in management literature, and is now considered under the broader term of **Materials Management**. A contribution of major significance to this subject is the new and modern approach outlined and charted on page 103, in which the responsibilities and functions of the complete supply operation are coordinated in a comprehensive management plan that defines objectives and assigns specific departmental duties.



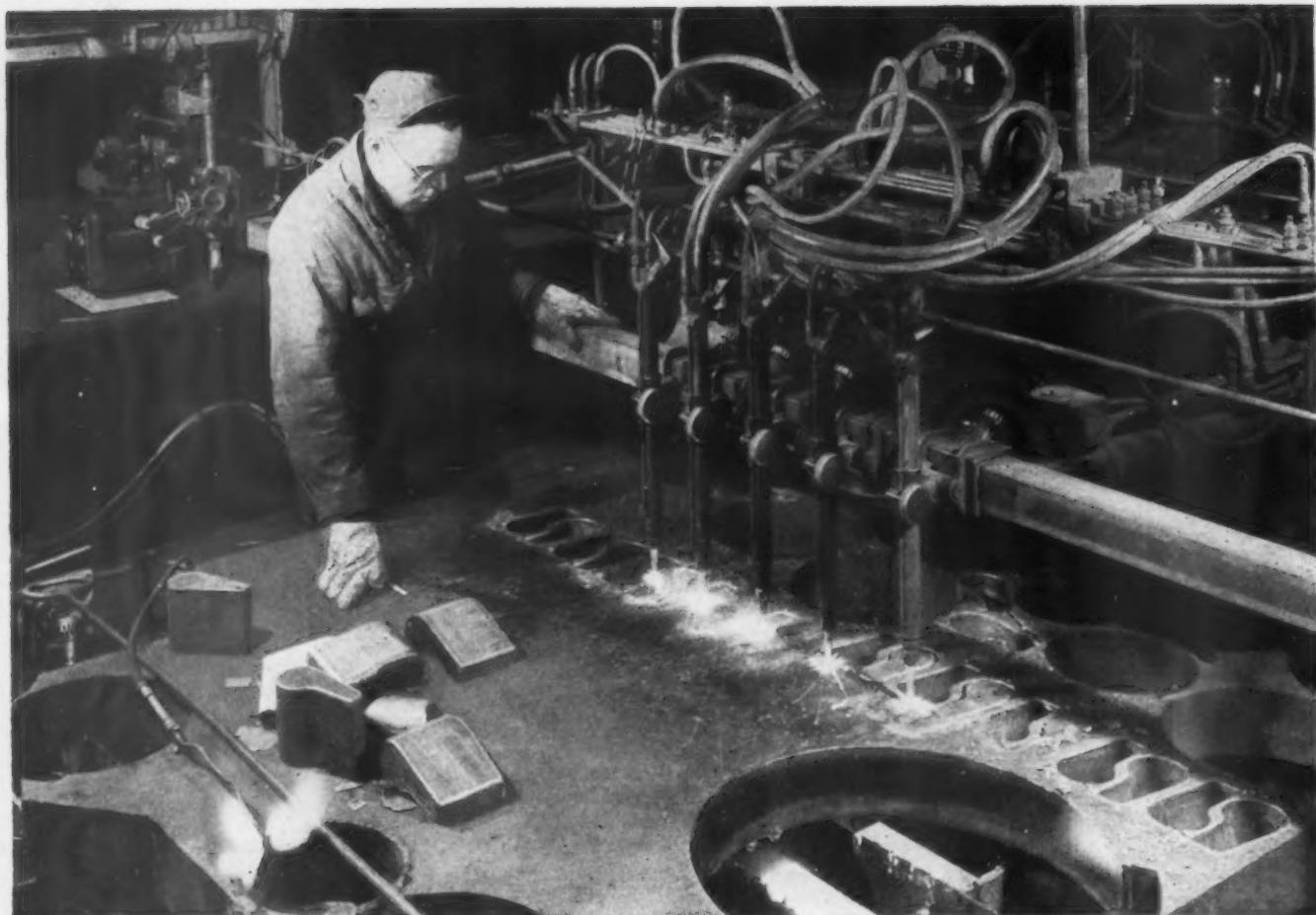
You'll find practical help on **Purchase Procedures** in the two systems illustrated and described on pages 114 and 135 of this issue. The first deals with the method of handling stationery supplies and forms in a large organization with several branches, and the second concerns a company where stores operations are under Purchasing Department supervision.

There has been a lot of emphasis on cooperation with vendors. What about the **Vendor's Obligation** to cooperate with Purchasing? The article on page 99 points out that cooperation is a two-way street.



The nation's annual loss due to **Fungus** attacks on construction, textiles, electrical parts, and a variety of other materials reaches staggering totals, and it is not confined to tropical regions. For a report on how this condition is being studied and how the loss can be minimized, turn to page 120.

Are you making full use of these monthly departmental features compiled especially to keep you informed on recent industrial developments? A selected list of new **Trade Bulletins and Catalogs** that are yours for the asking (page 12) and the illustrated summary of **New Products and Ideas** (page 148) will help you keep abreast of industrial progress.



The metal box, upper left behind operator, contains electronic tracing device which follows sketch and guides cutting torch.

New Electric Eye Machines Speed Ryerson Cutting Service

The multiple-torch gas cutting machine shown above is one of eleven recently installed in Ryerson plants from coast to coast. Equipped with an electronic eye tracing device, these remarkable new machines cut the most intricate shapes swiftly, accurately. Time spent in preparing wood and metal template making is eliminated. Instead the electric eye follows a simple sketch or blueprint within plus or minus fifteen-thousandths of an inch!

Many manufacturers are saving time and effecting substantial economies through the use of Ryerson flame-cutting. With electric eye machines rounding out a complete flame-cutting service, your Ryerson plant produces an endless variety of shapes from strong rolled steel. To mention only a few—circles, rings, wrenches, flanges, crankshafts, weldment parts, cams—many more. The result: clean, accurate edges whether mild steel, high carbon, alloy or stainless

steel is used. And your Ryerson plant can produce hundreds of pieces to the same pattern with almost die-cut uniformity, from steel plate up to 15-in. thick.

The new Ryerson cutting machines illustrate how we are continually expanding our facilities to give you faster, more efficient steel service. The exact steel you need, cut or otherwise prepared to your particular specifications is delivered promptly when you draw on large, diversified Ryerson stocks.

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BARS—Carbon & alloy, hot rolled & cold finished.

SHAFTING—Cold fin., ground & polished, etc.

STRUCTURALS—Channels, angles, beams, etc.

TUBING—Seamless & welded mechanical & boiler tubes.

STAINLESS—Allegheny bars, tubing, plates, sheets, etc.

PLATES—Sheared & U. M., Inland 4-Way Floor Plate.

SHEETS—Hot & cold rolled, many types.

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RYERSON STEEL

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Your Business . . .

My Business . . .

Our Business

● By N. J. Gibbins

BUSINESSMEN today are keenly aware of the fact that business is not done in a vacuum or within the confines of their own offices. They are deeply concerned with the problems of labor relations and public relations.

The Armed Forces of our country had during the war, and still have, active public relations departments to foster the cooperation of their industrial suppliers and to keep the public informed of their programs. The national government, in its dealings with other nations and through the medium of its overseas broadcasts, has a public relations program aimed at a better understanding of our national policies and objectives. Every sizable company has an industrial relations setup. The N.A.P.A. has reactivated

its Public Relations Committee, with a chairman in each of the 80 local associations.

Call this activity by whatever name you will, it all boils down to one basic aim. It is a cooperative effort to make *your* picture and *my* picture—our picture. This growth of mutual understanding promotes united effort, better workmanship, more production, and above all, greater human happiness in working together.

Through its regular contacts with suppliers and their representatives, the purchasing department has an important part in strengthening the public relations of the company. Looking inward, toward the contacts with management and other departments of the company, there is also an important relationship to be developed and fostered for more effective cooperation. This is far more than a theoretical aim.

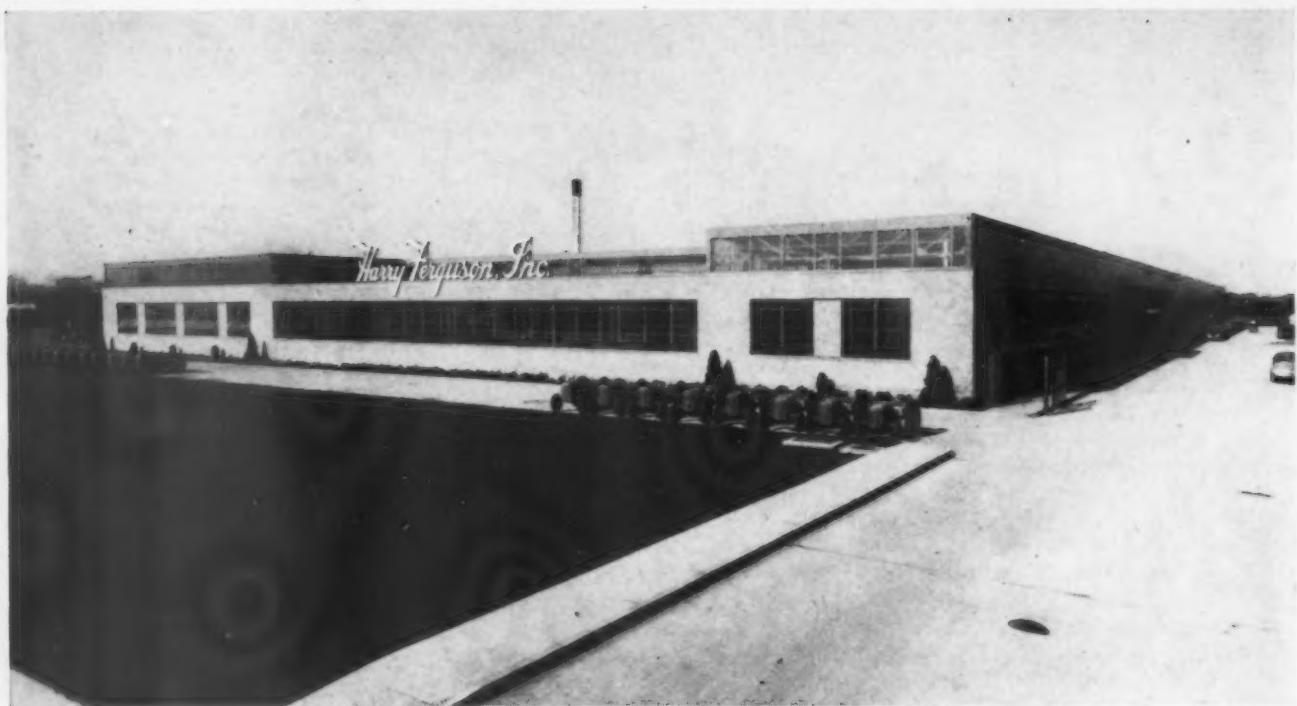
No argument is needed in support of the statement that sharp tools make for a happier workmen and better work. You have at your command exceptional facilities for sharpening the tools of your management. You are close to the markets you are dealing in, and you have access to the expert advice of 12,000 qualified buyers on any item you may name. Through the Association *Bulletin* you have the guidance of business and economic leaders who are constantly looking forward and gauging the changes in business conditions. These opinions are without bias or prejudice.

With this wealth of material, plus your own good efforts, you have all the spit and polish necessary to sharpen the thinking and extend the effectiveness of the efforts of your management. Shall we call this the development of purchasing-management relations?



Nelson J. Gibbins has been associated with the Motor Wheel Corporation, Lansing, Michigan, for a little more than a quarter-century, having joined that organization just a few months after his graduation from the University of Michigan as a civil engineer in 1923. His first job was as assistant efficiency and maintenance engineer. This was followed by a research assignment on wood and metal finishes. He became chief inspector in the early 1930s. With the coming of the war, he was placed in charge of priorities, and was appointed fuel and steel purchasing agent in 1943.

One of his first acts upon assuming the purchasing responsibility was to become affiliated with the Central Michigan Purchasing Agents Association, where his ability was promptly recognized and put to work. He served as President of the group in 1946-1947, and National Director in 1947-1948. As the logical sequel to that record, he was selected as Vice President of the National Association of Purchasing Agents in 1948-1949, representing District No. 4.



Purchasing for Assembly

Procurement is the vital factor in Ferguson farm equipment operations.

Comprehensive program of subcontracting is handled by modern purchasing techniques.

Production engineering and quality control are within the Procurement Division.

● By Dwight G. Baird

HARRY FERGUSON, Inc., of Detroit, is an unusual type of operation. It follows quite logically that the procurement set-up that has been developed for carrying on its part in that operation is also an unusual type of organization, particularly in that the functions of production engineering and quality control are included in the Procurement Division along with the purchasing and traffic sections.

The company is not a conventional manufacturer, in terms of the usual production activity. It designs Ferguson System farm equipment, including a tractor and about 70 varied farm implements, assembles

the tractor, has the implements and tractor components manufactured to strict specifications, and markets them through 31 distributors and approximately 1,500 dealers in the United States and Canada. It also has ambitious plans for an export division, but production thus far has not been sufficient to supply the domestic market. The corporation's sales totaled 33 million dollars in 1948, of which 5 million dollars was accounted for in December alone. Volume in 1949 is expected to greatly exceed that of 1948.

Harry G. Ferguson, President and Chairman of the Board of Directors, is the genius who is chiefly

responsible for the design and development of the system which bears his name. He spends most of his time in England, where he has a tractor plant, but keeps in close touch with the American corporation also.

Harry Ferguson, Inc., is managed by an Operating Committee which consists of: Horace D'Angelo, Executive Vice President; Robert G. Surridge, Secretary and General Counsel; Herman G. Klemm, Director of Engineering; Philip C. Page, Director of Distribution; Albert A. Thornbrough, Director of Procurement; Nils Lou, Tractor Plant Manager; and Charles

F. Herrmeyer, Treasurer and Controller.

The organization comprises five divisions: Engineering, Procurement, Distribution, Tractor Plant, and Treasury, with several staff departments, including Legal, Pricing, Industrial Relations, Market and Farm Practices Research.

The Procurement Division includes four departments: Implement Purchasing, Tractor Purchasing, Production Engineering, and Traffic. Albert A. Thornbrough heads this division as Director of Procurement.

Marshall Munroe, Assistant Director of Procurement, is also the Tractor Purchasing Agent and George H. Diegel is Assistant Purchasing Agent in this department. Other personnel includes several buyers and a manager of purchase control. This department buys 375 tractor parts and sub-assemblies, together with plant equipment and supplies, service parts, and related items.

J. L. Gilliam is Implement Purchasing Agent. He is assisted by a group of buyers and a manager of purchase control. Each of the buyers is responsible for the procurement of several implements and service parts for them.

Frank Hopkins is supervisor of the Production Engineering Department, which employs several production engineers working on both tractors and implements, and quality control inspectors who spend most of their time in suppliers' plants.

C. I. Ehinger is Traffic Manager. He has a staff of specialists on rates, routing, import-export regulations, packaging and crating.

"If we were only a national marketing agency, distributing other companies' products, we would be over-staffed," Mr. Thornbrough said. "Or if we followed the rather common practice of awarding contracts to the lowest bidders, we probably would be over-staffed. But we don't operate in either of those ways. We design our own products, then we process the jobs exactly as if we were going to manufacture them ourselves. About the only difference is that the implements, parts, and sub-assemblies are not produced in our own factories. They are produced in various suppliers' factories, but they are produced according to our designs and specifications, and we exercise close quality control over them in every respect. We have a substantial investment in fixtures, dies, patterns, and special equipment in our suppliers' plants, but we do not have a financial interest in any of our suppliers."

Duties of Engineering Division

The Engineering Division does the designing and writes the specifications, and it does so just as thoroughly and in as complete detail as if the products were going to be manufactured in the company's own plants. Production Engineering, a part of the procurement organization, assists the Engineering Division in drawing blueprints and specifications in such a way as to

conform with known conditions and problems of reasonable and efficient production.

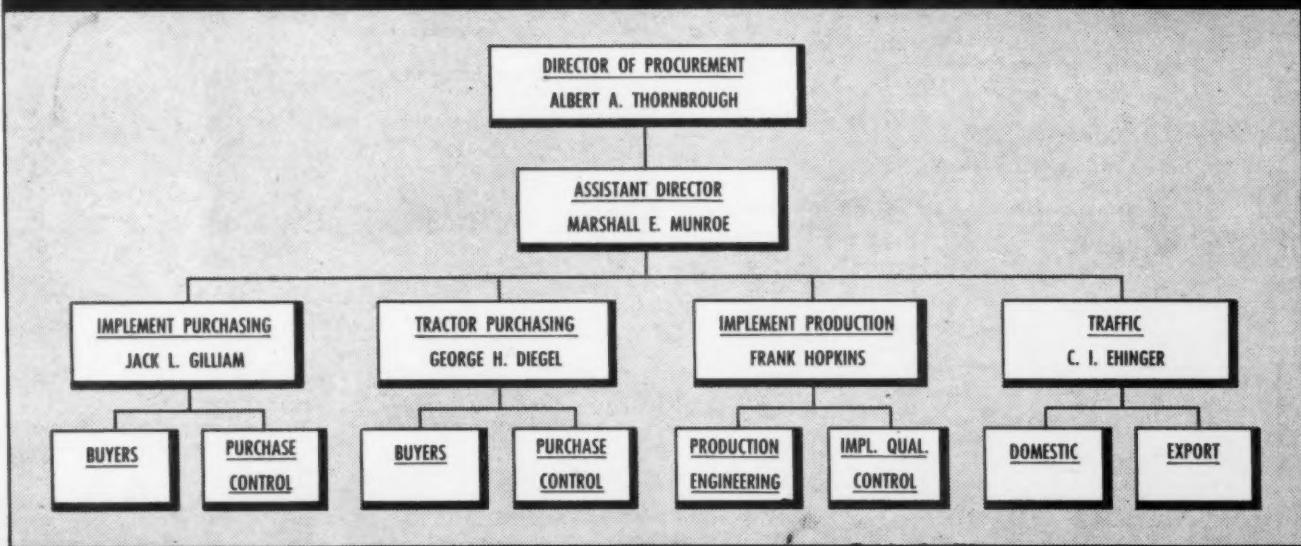
Finished blueprints, together with the necessary engineering information, are released to the Procurement Division, and the latter carries on from there.

Three copies of the release are furnished to Procurement—to the Director, to Production Engineering, and to the Purchasing Agent. The program is then assigned to a buyer, and he works closely with Production Engineering until it is completed.

The buyer is in charge of the program. "We believe that effective control is established through proper organization, functionalization, assignment of clearly defined responsibility, and exercise of authority," Mr. Thornbrough said. "When we say that a buyer is in charge of a program, we mean just that. He selects prospective suppliers, negotiates with them, makes recommendations, and signs his own purchase orders. Of course, in unusual situations involving a long-term contract, management will usually have a voice in the final decision. Production authorizations to suppliers usually are approved by the Operating Committee, acting on Procurement recommendations and subject to Procurement advising the Committee as to price before placing the orders.

"But we do give the buyers considerable authority, and we find that this is instrumental in developing better men and a better organization.

ORGANIZATION OF THE PROCUREMENT DIVISION



IMPLEMENT - Manure Loader - L-UD-20			Harry Ferguson, Inc.			DATE 3-27-49 ISSUE NO. 3		
INFO'D BY _____			BILL OF MATERIAL AND ORDER RECORD			SHEET NO. 1 OF 7 SHEETS		
UNITS CHARGED								
PART NUMBER	PART NAME	QUAN. PER UNIT	PRICE PER PIECE	MATERIAL SPECIFICATION	SIZE OF STOCK ROUGH	MATERIAL SOURCE	P. O. NO.	DATE ORDERED
L-UD-20	Manure Loader Assembly	1						QUANTITY ORDERED
L-UD-400A	Cylinder Assy. Hydraulic	2						DATE PROMISED
L-UD-400A	Cylinder Assembly - Hyd.	2		Optional with L-UD-400A				
L-UD-401A	Cap - Cylinder End	2	2.60	\$ or equiv.	SAE 1010 Malleable Iron			
HARRY FERGUSON, INC.								
PROJECT Manure Loader MODEL NO. L-UD			COST ANALYSIS SHEET			March 1, 1948		
						SHEET NO. 1 OF 1 SHEETS		
LINE NO.	PART NUMBER	PART NAME	QUAN. PER UNIT	MATERIAL COST PER PIECE	FREIGHT PER PIECE	SCRAP PER PIECE	TOTAL MATERIAL COST PER PIECE	TOTAL MATERIAL COST PER UNIT
								STD. HOURS PER PIECE
								STD. HOURS PER UNIT
								Labor Cost Per Unit \$
								Labor Variance Per Unit %
								BURDEN \$ PER UNIT %
								TOTAL MAT. LAB. BURDEN PER UNIT
								ADMINISTRATIVE %
								PROFIT %
								TOTAL COST PER UNIT
L-UD-413 Pin - Front Pivot 2 .0353 .007 .0018 .0376 .0796 .0106 .0212 .0276 .0095 .0414 .1501 .0060 .0159 .1711								
OPERATION SHEET								
PART NAME Pin - Front Pivot			MODEL L-UD 2 L-UD 413			PRICES PER UNIT		
ISSUE NO. 1 DATE OF ISSUE 2-25-48			SUPERSEDES PART NO. 2-19-48			NEW REASON FOR CHANGE PROCESSED BY B.K.		
MATERIAL SAE 1010-1020 H.R. Bar			SIZE OF STOCK ROUGH 3/4 Dia. x 3-13/16			PRICES PER BAR OR SHEET WEIGHT PER PIECE		
OPEN DATE 10			DESCRIPTION OF OPERATION PROD. OPEN TOTAL REGISTER			MACHINING RATES, HRS. MACH. TIME OF TOOLS PICTURES, PINS & GAUGES		
DEPT. NO.			PER HOUR	STOKE HRS.	STOKE HRS.	TIME	OF	
10 Chamfer & Cutoff			200	.0050	.0050	Est.	Hand Screw Machine	Standard
20 Drill - (2) 17/16" dia. 1 Min - 2 Spind			180	AVG	AVG	4.00	Drill Jig	
30 Case Harden (Send out @ .04)								
40 Inspect								
HARRY FERGUSON, INC.								
PROJECT Manure Loader MODEL NO. L-UD			TOOL COST ANALYSIS SHEET			DATE 3-1-48 ISSUE NO. 1		
						SHEET NO. 1 OF 1 SHEETS		
PART NO.			PART NAME			TOOL DESIGN	TOOL MANUF.	TOTAL TOOL COST
L-UD 413			Pin - Front Pivot			COPT	COPT	
HARRY FERGUSON, INC.								
PURCHASE REQUISITION			REQ. NO. 31202			FOR SAMPLE PURPOSES ONLY		
HARRY FERGUSON, INC.			DATE 1-27-49					
ACCT. NO.	QUANTITY	PART NO.	SPEC. & DESCRIPTION			PRICE		
416-	3,000	L-UD-20	Manure Loader Assemblies to be manufactured in accordance with Ferguson's drawings as enumerated on attachment hereto and Ferguson Manufacturing and Finish Specification #MF-102.					
NOTE: Price for first 1,000 Units \$20.00 Each								
HARRY FERGUSON, INC.								
PURCHASE REQUISITION			REQ. NO. 31202			F.O.B. CLEVELAND, OHIO		
ACCT. NO.	QUANTITY	PART NO.	SPEC. & DESCRIPTION			TERMS	NET 10th & 25th	
416-			To cover cost of designing and building the following tools for the production of the L-UD-20 Manure Loader:			ROUTING		
			D-1591 Drill Jig (L-UD 413)					
SAMPLE PURPOSES ONLY								
DEPARTMENTAL COMMUNICATION								
HARRY FERGUSON, INC. DETROIT, MICH.								
To: Mr. J. Smith	Date: May 18, 1949							
Phone: J. C. Jones								
SUBJECT: PACKAGING OF L-UD-20 MANURE LOADER								
The following procedure has been finalized as a domestic packaging on the L-UD-20 Manure Loader:								
Bundle #1 The L-UD-8801 will be assembled with L-UD-7802, L-UD-7803, L-UD-7824, L-UD-7825, L-UD-7801.								
L-UD-835 and L-UD-834 will be wired to L-UD-7802 and L-UD-7803								
(2) pieces of L-UD-7803-A will be wired to either side of L-UD-7801.								
L-UD-20 Manure Loader Miscellaneous Parts Packing List								
BOX No. 1 (12 x 13 x 4 Carton) HARDWARE (8 x 12 Muslin Sack)								
1 - L-UD-400-A1 Cylinder 1 - L-UD-420 Drop Valve 1 - L-UD-428-A1 2 - L-UD-503A Retainer Assembly 1 - L-UD-8-0-1 Latch 1 - L-UD-814 Foot Trip 2 - L-UD-816 Pin 1 - L-UD-408 Spacer 1 - L-UD-409 Spacer 1 - L-UD-416 Gasket 1 - L-UD-433 Adapter 1 - L-UD-434 Adapter 1 - TO-582 Shackle 1 - L-UD-805 Rod 1 - L-UD-806 Spring								
BILLING INSTRUCTIONS								
Invoices, Memos of Shipment and Bills of Lading must bear this order number and be mailed on date of shipment. Packing Slips, Packages, Machines, etc., must also bear this order number.								
Bills of Lading Notices of Shipment Packing Slips Invoices in Duplicate								
Mark 8 1/2" "Subject to Inspection or Delivery." Attest Original Signed and Dated by HARRY FERGUSON, INC. 3639 E. Milwaukee Ave. Dear Cor Number								
A numbered packing slip must be placed in each package. Careful shipments must have detailed packing instructions in enclosed envelope and packed made air-tight.								
All invoices must be submitted in duplicate to ensure prompt payment. Mail to: HARRY FERGUSON, INC. 3639 E. Milwaukee Ave.								
IMPORTANT								
Please sign and return acknowledgment by _____ immediately by mail.								
N. 30188								

The buyer who signs his own purchase orders is likely to be more careful and more thorough than he might be if he had to pass them on to the Purchase Agent without his signature. Control over the buyer is through supervision and the evaluation of the results obtained by him."

Consideration is given to all qualifications of prospective suppliers, and also to their location with reference to markets. A farm implement of a given type may be used more extensively in some parts of the country than in others, hence a supplier located in or near the area where that implement is likely to sell in largest volume is favored because of shipping costs. Consideration is also given to traveling expenses of quality control inspectors, who must visit suppliers' plants frequently. If two or more suppliers can be obtained in one city or area, time and traveling expense may be conserved to a worth-while extent.

Then too, farm implements are seasonal in their use, hence a suppliers' entire business should not be dependent upon Ferguson purchases. "We want our suppliers to be healthy in a business sense," Mr. Thornbrough said. "If one of our suppliers is ailing, then our program is affected."

Meanwhile Production Engineering is processing the production job, and it does so exactly as if it were going to set up a production line to manufacture the implement.

Operations Sheets

First there are the operations sheets, which are exactly like those of an efficient factory. Listed, among other things, are the material, size of rough stock, size of finished stock, pieces per bar or sheet, weight per piece, operation number, description of operation, production per hour, operating standard hours, total standard hours, register number, size and type of machine used, tools, fixtures, dies and gages. There is of course a separate sheet for each part.

Then there is a bill of material, listing every item by part number, part name, quantity per unit, weight per piece, material specifications, size of stock rough, and spaces for material sources, purchase order number, date ordered, quantity ordered, and date of delivery promised.

They then make up a cost analysis sheet, listing part number, part name, quantity per unit, material cost per piece (carried out to four decimal places), freight per piece,



Albert A. Thornbrough, Director of Procurement, inspects components and assembly of a Ferguson farm implement.

scrap per piece, total material cost per piece, total material cost per unit, labor variance per unit, burden per unit, total material-labor burden per unit, administrative cost, profit, and total cost per unit.

Next is a tool cost analysis sheet, on which are listed the tool design cost, manufacturing cost, total cost, and remarks. All of the implement suppliers and most of the tractor component suppliers have at least some Ferguson tooling in their plants.

Production Engineering thus works out detailed costs of every part and sub-assembly, and prepares a recommended tooling program, together with the estimated cost of such tooling. Nor are these mere estimates; these production engineers in their procurement assignment have been in so many plants and are so familiar with production methods that they know exactly what the requirements and costs are in every instance, and they don't miss by much, if at all, as will be shown.

On completion of the processing operation, the buyer to whom the program has been assigned begins negotiations to obtain the implement or part at the estimated price, or as close to it as possible. Qualifications of several prospective suppliers are considered, and the list is narrowed down to a few. Meanwhile, Production Engineering continues to work with the buyer in surveying prospects' plants and facilities, reviewing the tooling program with them, and discussing costs.

"In cost cases, suppliers' original bids are considerably higher than our estimates," Mr. Thornbrough said. "We have worked for a whole year to find a satisfactory supplier for some implements. In a few unusual instances, we have found that a prospective supplier will submit an estimate which originally may be 40% to 75% higher than our own estimate. If we had operated on the principle of merely awarding the contract to the lowest bidder, we would have paid far too much for such items, and if we hadn't proc-

HARRY FERGUSON, INC.
Detroit, Michigan

VENDOR SHIPPING RELEASE AND MATERIAL SCHEDULE

PART NAME

Part No. _____
Release No. _____
Date _____
Supersedes _____
Release No. _____

This release supersedes previous releases against purchase orders indicated and is your authority to ship, fabricate and purchase materials for above mentioned material as specified below.

LAST SHIPMENT CONSIDERED	QUANTITY	REFERENCE	AFTER "LAST SHIPMENT CONSIDERED" SHIP AS SPECIFIED BELOW					
			DATE TO SHIP	QUANTITY	ACCUM. THIS RELEASE			
<u>OPEN PURCHASE ORDERS</u>								
ORDER DATE	ORDER NO.	BALANCE						
<u>BALANCE DUE TOTAL</u>								
<u>PLANNING SCHEDULE</u>								
1. Shipments Authorized this Release 2. Fabrication Only, Authorization 3. Raw Material Only, Authorization 4. Balance due on purchase orders for which materials are not to be provided			REMARKS					
VENDORS NOTICE OF SHIPMENT MUST BE MAILED TO OUR PURCHASING DEPT. SAME DAY SHIPMENT IS MADE. The Seller is authorized to fabricate the quantity of material authorized in Item 2 in addition to deliveries to be made in accordance with this release. However, shipments must be in accordance with shipping schedules which will be forwarded to Seller. The Seller is also authorized to procure, but not to fabricate, the raw material indicated above in Item 3. This release includes all material returned to you for credit or for replacement at your expense. Kindly check the total balance due on orders as shown above with your records and advise us immediately of any discrepancies. DO NOT UNDER ANY CIRCUMSTANCES OVERSHIP THE TOTAL QUANTITY SCHEDULED FOR SHIPMENT UNTIL AN ADDITIONAL SHIPPING RELEASE HAS BEEN PROVIDED.								
SHIP TO			HARRY FERGUSON, INC.					
Purchasing Dept.								
PLEASE ACKNOWLEDGE RECEIPT OF THIS RELEASE BY RETURN MAIL.								

**Fabrication and delivery of purchased parts
is authorized by a shipping release.**

essed the job ourselves, we might not even have known that we were paying too much for it. As it is, we usually get these items at a cost very close to our original estimate. In many cases, the slight difference can be accounted for by a change in the cost of basic materials or in freight rates which have been made after our engineers processed the job.

"We have had instances where an implement selling for several hundred dollars has been obtained at a cost that was within one cent of what we had estimated it would cost to make. Another item that sells for over \$300 costs us just 13 cents more than we originally anticipated.

"In negotiating with suppliers, we don't show them our figures and we don't ask them to show us theirs. Some will quote a price right off the cuff; when they do so, they automatically eliminate themselves.

from consideration by Ferguson. We don't want that kind of suppliers. Others quote a high figure, and then we tell them they are high, they usually will produce their operations sheets and get down to details. We then review these with them and point out where and why they are high in relation to our estimate. Perhaps one is figuring on using a single-spindle drill press on an operation for which we had considered a multiple-spindle machine necessary to efficient production. If so, we point this out and show him that a multiple-spindle machine would be more economical. We get into the subject of tooling, and, if necessary, we may agree to furnish a multiple-spindle head for his single-spindle drill press.

"We buy complete implements, and we buy service parts for them competitively. We may or may not buy service parts from the supplier who makes the complete implement.

We don't presume to tell suppliers where to obtain parts, but in many instances we are able to assist them in obtaining parts at a saving.

"Last year, for example, one company that was going to produce an implement for us reported that one of the components was going to cost him over \$1 each, whereas we were buying the same part at 11 cents. Needless to say, we told this supplier where to procure such parts at a reasonable price, and this saving was reflected in our own costs.

Lower Prices Available

"In another case, after we had placed into production a wheel part for our tractor, two of our implement manufacturers wanted to use the same part on their products. We were able to tell them where they could get the part for 50% less than they had been quoted.

"Similarly, we use considerable quantities of bolts, nuts, and other small items, and we obtain them at prices considerably lower than our suppliers sometimes are quoted.

"We maintain a cost control record that is posted weekly if any price changes have occurred. Each buyer has a section of the cost control record which includes the items that he buys.

"When a supplier has been selected, Production Engineering continues to work with our buyer in setting up production, and implement quality control inspectors obtain a production sample of each part. No production can be authorized until such a sample of each part has been approved, and the supplier is not paid for tooling until it has been qualified as being capable of producing parts to specifications. Qualification of tooling is a function of the Production Engineering and Quality Control sections of Procurement. Proper qualification is the biggest step in making sure of getting the quality stipulated in the purchase order.

"Production Engineering maintains all tool records, blueprints, sketches, master samples, and all tools, dies, and fixtures not in use. In case a program is moved, a production engineer lives with the job until it is properly set up in the new location and until the parts and implements meet specifications."

All details concerning production of a given implement having been agreed upon, the Operating Committee releases a production authorization for an agreed quantity of implements, perhaps for a season's requirements. A blanket purchase order for this quantity is then issued.

Two attachments accompany this purchase order. One of these is devoted chiefly to defining the terms and language used, and the other is a parts list with engineering information release dates.

The original and acknowledgment copies of the purchase order are sent to the vendor. Other copies are distributed as follows: to Purchasing, Purchasing numerical file, Accounting, Pricing, Production, Procurement, Traffic, Shipping, and two copies held as spares.

The same kind of purchase order is issued to cover tooling, and to this is attached a copy of the tooling agreement.

Meanwhile, the rates section of the Traffic Department (which is also a part of the Procurement Division) has been busy preparing shipping plans, while the packaging and crating section has been devising a procedure for packaging and crating the parts and sub-assemblies. This procedure is typed in complete detail, giving instructions concerning the containers to be used, parts to be packed in each, etc.

The Procurement Division maintains a forecast of production compared with schedules, and revises this monthly to show such details as balance of implements on hand

at supplier's plant, quantity on order, balance due on order, backlog or overage, and balance remaining on order beyond the forecasted quantities. Each buyer has a perpetual inventory parts card for each item he buys.

When a supplier gets into production on a Ferguson implement or sub-assembly, a quality control inspector is on the job. After production samples have been accepted, he visits the plant at frequent intervals. Some of the inspectors in this department travel in and out of Detroit, while others are located in other areas. All have had experience as tool, die, or pattern makers and some have engineering training. They are expected not only to make sure that all parts and components are up to specifications, but also to be able to help the supplier find and correct the trouble when anything goes wrong. They submit written reports of their activities to the Director of Procurement and to the supervisor of their department weekly, and they also consult with the buyers concerned when there is anything that should be brought to their attention.

The vendor shipping release and material schedule is in two parts. The first authorizes the number of

units to be shipped and includes authorization for fabrication only, for raw material only, and balance due on purchase orders for which materials are not to be provided. The second part is the same form with ruling at the bottom for a record of shipments. There are two copies of the first section and three copies of the second.

Suppliers submit a daily implement and service parts production report to Ferguson, sending two copies to the Purchasing Agent and retaining one. Of the two copies received by Ferguson, one is retained by Purchasing, and the other goes to Purchasing Control. The figures are cumulative, and include: purchase order number, quantity this order total produced against this order including today's production, quantity produced today, and quantity shipped today.

Invoices are written by the release section of the Sales Department and are forwarded to the Traffic Department, which completes the shipping instructions. Then these arrangements are forwarded by the buyer to the supplier of the implements and accessories. With the shipment of a tractor, the invoices are sent from the Traffic Department direct to the tractor plant.

Operating Committee of Harry Ferguson, Inc. (left to right) A. A. Thornbrough, Procurement; C. F. Herrmeyer, Controller; R. G. Surridge, General Counsel; Horace D'Angelo, Executive V. P.; H. G. Klemm, Engineering; Nils Lou, Plant Manager; P. C. Page, Distribution.



Some Not-So-Well Known Facts about PIPE AND FITTINGS

PURCHASING Agents are properly warned against broad generalizations and "rule of thumb" methods in selecting the right materials for a given purpose. However, there is a great amount of experience in the use of materials that should not be discounted within the proper scope of its application, as a starting point for more detailed studies if the occasion warrants. The buyer will do well to familiarize himself with some of these factors of commonplace knowledge. They will save him a lot of time, and will start him in the right direction. One of the very important elements of this information is the constant reminder that the application and handling of products is oftentimes as basic as the material itself. Following are a few practical pointers in this category regarding pipe and pipe fittings.

In general, screwed fittings are most satisfactory for low pressure work, and even for higher pressures when the joints are carefully made. Seldom if ever, though, should screwed fittings be used on pipe sizes exceeding 6 inches. Larger sizes are likely to leak because of the difficulty of screwing up sufficiently tight. Beyond 6-inch sizes, flanged fittings are usually recommended.

Quick calculations to help in selecting the right pipe for the purpose.

Flanged or screwed fittings? Advantages and limitations.

Pressure, temperature, and safety factors must be considered.

By W. F. Schaphorst, M. E.

Many years of confusion led manufacturers and users of fittings finally to agree on one standard—the "American Standard". To be on the safe side, this standard should always be specified where possible. Complete data covering the American Standard are procurable from the American Society of Mechanical Engineers or from almost any recent mechanical engineering handbook.

Should you wish to determine the approximate bursting strength of a fitting in pounds per square inch, multiply the tensile strength of the metal by 6, multiply that by the thickness of the metal in the body of the fitting (in inches), divide by the internal diameter of the fitting (in inches), and divide that result by 10.

When tightening bolts, never slip a pipe over the wrench handle to

increase leverage. Wrenches should be short enough so that the bolt tightened will not be over-stressed. A good rule to apply for determining the proper length of a wrench is to multiply the size of the bolt by 15. The result is the length of the wrench, in inches. Thus, for a $\frac{1}{2}$ -inch bolt use a $7\frac{1}{2}$ -inch wrench, for a 1-inch bolt use a 15-inch wrench, for a 2-inch bolt use a 30-inch wrench, etc.

The factor of safety for steam piping should be at least 6.

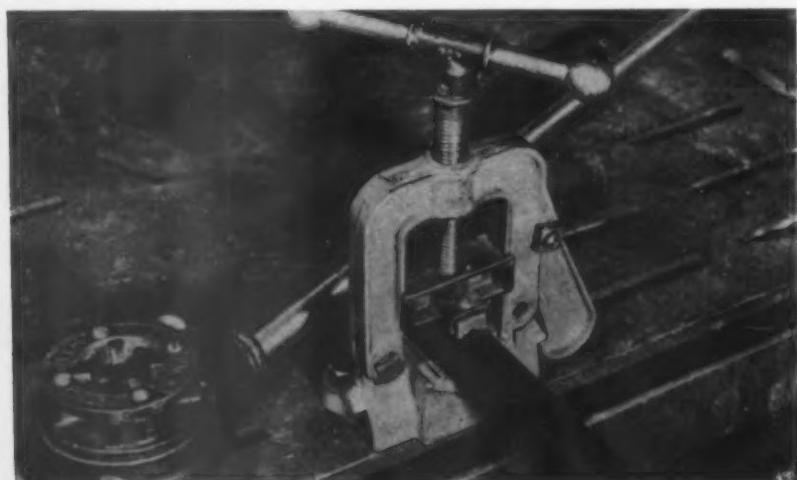
The relative strength of various kinds of piping can be roughly estimated as follows, using butt welded wrought iron pipes as the standard value, 1. Lap welded wrought iron, 1.1; butt welded steel 1.5; lap welded steel, 1.9; seamless steel, 2.0.

Extra heavy pipe is better for bending in small sizes. It is not so apt to split, and gives a rounder bend.

Riveted pipe is weaker than lap welded pipe. Spiral riveted pipe averages about half as strong as lap welded. Straight riveted pipe is weaker than spiral riveted, develops more friction, and should not be used for hot water, live steam, or high pressure hot liquids or gases.

Copper and brass pipe are being used more and more because of their non-corrosive properties. Brass pipe in standard iron pipe sizes is most convenient to use, although it is usually heavier, consequently more costly. The thinner tubing should not be used for high pressure work. Copper should not be

(Please turn to page 326)



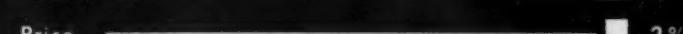
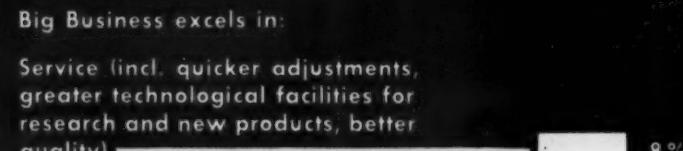
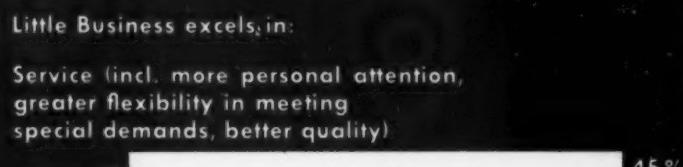
What Is the Place of "LITTLE BUSINESS" in American Industry?

The continuing debate on "big" vs. "little" business has been highlighted recently by governmental action against large corporations and by legislative discussions on laws to curb monopolistic practice. While there is general agreement that little business has a place in the American economic system, it is beset by many problems, which may add up to the basic problem of economic survival. We asked purchasing agents in all parts of the country, dealing with both big and little business firms as competitive suppliers, for their opinions on the situation. Their answers, in combined form, appear below.

- ① (a) Do you find that there is any substantial difference in the service, efficiency, price, reliability and cooperation offered by "little business" and "big business" firms among your suppliers ?



- (b) If "yes", please specify*



*Some respondents named more than one choice on this question, so percentage factors total more than 100.

② Do you make it a policy to give a reasonable proportion of your orders to "little business" firms ?

YES

87 %

NO

13 %

③ In your opinion, is "little business" able to meet the competition of "big business", within the limits of its own capacity ?

YES

93 %

NO

7 %

④ Have you noticed any decline in the number of small companies available to you as suppliers ?

YES

19 %

NO

81 %

⑤ Do you favor a national policy of tax advantages, preferential legislation, or other governmental means of support to aid "little business" as such ?

YES

36 %

NO

64 %

— WHAT THEY SAY —

"Don't support 'littles', but enforce present anti-monopoly laws to prevent squeezing. 'Littles' are not always marginal and can compete under fair conditions."

"All too often, we as purchaser have to adapt, change, or modify our purchasing methods to conform completely to a sales system of 'big business'."

"Too much emphasis now being placed on the power of control of the 'bigs' — I say let 'em go! They will soon split up of their own accord or get too big for efficient operation."

"The golden opportunity for small business is in familiarizing buyers with spare parts and sub-assemblies they can furnish or have furnished as sub-contractors under large companies."

"Variations within each category are so great that it is logical to conclude that the differences are the result of the particular personnel within a company, rather than its size."

"Must we suffer encroachment by socialistic tendencies in an effort to settle a debate as to whether the 'good angel' is to be called 'little business' and the 'bad angel' called 'big business'? Both will always have their place in our economic structure."

"Business is the same regardless of size. Keep the legal aspects even and the customers will judge the enterprises, both large and small, with adequate severity."

"The story of small business is being over told. One must remember that large business is small business when one considers the stockholders. The answer to this problem is a reduction of government spending and lowering of taxes. Then 'little business' and 'big business' would be really able to cooperate."

"There might be a National Research Policy where the small fellows would have a chance to manufacture new developments that the National Research had developed."

Cooperation Works Both Ways

Purchasing men are irritated by careless habits of handling orders.

Competition puts a premium on courteous service and follow-through.

Administrative details are important in building good business relationships.

● By Stuart F. Heinritz

THERE has been a good deal of pious talk these past two or three years—ever since the first faint threat of the return to a buyers' market appeared on the business horizon—about the development of good relationships between buyers and suppliers. We have been adjured to remember that buying and selling are two aspects of the same transaction, mutually dependent upon each other, with common interests and complementary aims, and that sound, profitable business can best be built on a foundation of dealings that have an element of permanence and stability. The thought has been expressed with equal vigor and conviction by leaders in management, in sales, and in purchasing.

Nobody will quarrel with the basic truth of this principle. That sort of thinking and admonition and practice has been needed, for those relationships were badly strained in many instances. Wartime and the period of postwar shortages were trying times for buyer and supplier alike; neither one was able to operate or to maintain his business contacts exactly as he might have wished to do. And while the abnormalities and limitations of those conditions were generally recognized and understood, we came out of that period with a lot of accumulated grievances and resentments, legitimate or otherwise, based on real or fancied ill treatment in our time of need.

To be sure, there were some beautiful commercial friendships formed and deepened in that experience of working together, and these will not soon be forgotten. Many suppliers were keenly and constantly

aware that the business cycle must eventually proceed into another phase when they in turn would need the good will of their customers, and they acted accordingly. That far-sighted policy is now paying dividends in loyalty, even as buyers today are looking forward to similar advantages of service and consideration from loyal suppliers when we move on into the next cycle, based on present cooperation.

But let's be frank, too. There was hardly a buyer in 1947 who didn't have his "little black book", literally or figuratively, and who wasn't itching for the chance to use it. The black book wasn't for the sellers who had fallen down on a delivery (except for outright inefficiency, which makes a supplier undesirable in any case), because that was often unavoidable and extenuating circumstances can always be condoned. It did list the firms that might have tried a little harder, and those who came through with poor grace or with an excessively patronizing air, and those who had shown themselves to be opportunists at heart.

Then with the inevitable change in the business climate, "Forgive and forget" became the slogan of the day. Purchasing agents are entitled to take some credit for generally subscribing to this policy, for it would have been only human to exercise some of the economic sanctions that came within their power and to watch the other fellow squirm. They shouldn't take too much credit for acting on a high ethical plane, however for business ethics—like the homely folk wisdom expressed in the copy-book maxims—generally has a hard, solid core of practical self-

interest. "Honesty is the best policy" is an economic rather than an ethical precept. Perhaps purchasing agents today are remembering the advice: "Don't cut off your nose to spite your face." After all, the success of any purchasing program does depend on its suppliers. We talk about the long range view, and we know that the business cycle will repeat itself sooner or later, but meanwhile the short range requirements still have to be met.

At any rate, the little black books have largely disappeared. Some of them may have been prudently filed in the bottom drawer for possible future reference, but most of them were thrown away.

Yet all is not sweetness and light, and the suggestion has recently come from more than one source that perhaps the time has come to start another black book. You get it, for example, in the little informal group conversations that follow a high-minded address at some association meeting on the subject of business relations. You get it in the correspondence following publication of an article on this topic. You get it in the echoes of a convention where the common cause of buying and selling has been eloquently proclaimed.

This proposed new edition has little to do with the field of ethics. It is being compiled on the everyday plane of common courtesy and attention to details in the conduct of business. It will list that annoying minority of business houses that fell into careless habits in the easy days of the sellers' market and haven't taken the trouble to mend their ways. Unwittingly perhaps, but

none the less effectively, they are putting a tremendous and unnecessary handicap upon their sales representatives in the present competitive state of business, and it is quite possible that they are blissfully unaware of why it is that the repeat orders are going elsewhere. They put the blame on general business conditions and take a dark look of the business outlook, when a large share of the blame is actually in themselves. The saddest thing about this situation is that the remedy is simple, obvious, and inexpensive. They are needlessly penalizing themselves when they may be thoroughly competitive as to production efficiency and pricing policy and technological progress, simply because they persist in making it difficult and irritating to do business with them.

A good deal of emphasis has been placed on the human relationships in business, the person-to-person contacts and cooperation that are the daily order of business across the buyer's desk. We are urged to remember that the purchasing agent and the salesman are the duly appointed representatives of their respective companies—that, in fact, they *are* the company in respect to any given transaction. These personal relationships have always been among the most satisfactory and pleasant aspects of the purchasing job. The salesmen, God bless 'em, are more than doing their part. The men on the firing line take their role of personal representation very seriously.

But what happens after the salesman does his stuff and gets an inquiry or an order? Is his part of the job finished? And are we still dealing with the same sort of company that he represented it to be? We have accepted too easily and too literally the principle that cooperation is a simple two-way proposition. It now appears that it takes three to make cooperation effective. The party of the third part is the organization and the policy that stands back of the salesman, but frequently fails to back him up.

Take the very simple case of a purchase order that the salesman has won in fair competition. The order is valid only when accepted by the home office. That's common business practice, and the buyer is used to doing business on that basis. But does the home office bother to send back an acknowledgement, even when a convenient duplicate copy or a detachable coupon is furnished with the order, or does the purchasing agent have to send repeated "re-

quests for acknowledgment" to avoid being left with a dubious open-end commitment? Is the buyer expected to await actual shipment of the goods as evidence that his order has been accepted? What happens if the goods are not shipped?

Does the supplier's acknowledgement, if and when eventually received, carry a definite and dependable shipping date? Does it conform with the buyer's requested delivery? Does the seller make a conscientious effort to meet his shipping promise, or do the goods arrive ahead of schedule, suiting the shipper's convenience but disrupting the buyer's inventories and flow of materials? If anything should arise to prevent shipping on schedule, is the buyer advised as soon as the situation becomes known, so that he can do something about it if necessary, or does he have to institute follow-up action to find out, too late, that the delivery will be delayed?

That's only one phase, and probably the simplest case of faulty cooperation. Let's complicate it slightly by assuming that as the result of interview and negotiation, to meet a particular condition of the buyer's requirements, the salesman—representing his company—has agreed to certain special terms or special manner of handling the order. In his judgment, it is a legitimate request, involving no issue of major policy and no significant "concession"; it is merely a matter of adjusting service to need, a means of effecting that meeting of minds which results in the order. The significant feature of this agreement is that it is the deciding factor in the placing of the order that gives the salesman's company the competitive edge in his particular transaction. How many times is such a simple request ignored, or cavalierly overruled with the curt explanation—if any—that trade custom or the seller's standard practices must apply?

The purchasing agent may have a question that the salesman is unable to answer personally. It is referred back to the home office which knows all the answers. Is the reply promptly forthcoming? Is it pertinent, specific, helpful? Or is it handled in perfunctory routine fashion by sending a duplicate copy of the bulletin which the salesman has already left with the buyer, and which neither of them are quite able to interpret in the light of the specific problem?

Buyers are frequently criticized, and sometimes with good reason, for ordering in excessively small quantities. The small order evil is an economic liability for both the buyer

and the seller. Both sides have given a lot of thought to this problem and its solution. Working together, they can often arrive at a policy that will minimize, if not altogether eliminate this practice. But what about the supplier who receives a normal good-sized order and then proceeds to make partial deliveries, leaving the purchase file cluttered with open orders and messy little back orders, and multiplying the buyer's chore of handling and processing the small fill-ins on receiving, stock and accounting records?

These complaints and others like them will be recognized by every purchasing agent, and by some salesmen who have had to try and explain them away, and by a few management executives who may not be aware of their importance. The point in rehearsing them here is to stress the fact that there is one area which is sometimes overlooked in the building of good business relationships—the administrative policy and performance in handling the detail of customers' requests and orders—the follow-through without which even consummate salesmanship can result only in dissatisfaction and irritation.

Product, price, and personality may land an order, but they don't establish a lasting customer connection unless the company itself is easy to do business with, courteous and thoughtful in the handling of its accounts to promote a smooth and trouble-free relationship.

Purchasing agents have gone to great lengths to "educate" their suppliers as to their own material and procedural requirements. Salesmen have been known to battle just as vigorously with their own home offices as with their toughest prospects, in their demands for adequate cooperation and follow-through. With all due respect to these laudable efforts, it is a responsibility that really belongs neither to purchasing or sales, but to administration within the company itself.

If management is really serious in its desire to build better business relationships, it will realize that its sales representatives must be backed up with constructive cooperation all along the line. The shipper or the billing clerk who dismisses a customer's request or instructions with the comment, "Nuts, this is the way we do it here," can undo months of intelligent sales effort. In a highly competitive situation, that may be the deciding factor in holding or losing a customer. And customers are still the most valuable asset that a company can have—for today and for tomorrow.

Management from the Bottom Up

By William B. Given, Jr.,
President, American Brake Shoe Company
New York

Initiative is the prime requisite in profitable company operation.

Management expects some errors, and expects to profit by them.

Period of great opportunity is ahead for the purchasing department.

ALMOST every company pays at least lip service to decentralization of management authority. Actually, all companies are, each in their own way, trying to decentralize. The head of a business who is not working for decentralization in effect says to the world: "I am the only fellow of any ability in this company—and incidentally, what happens after I die is of no interest to me."

At American Brake Shoe, we have perhaps gone further than some other companies in developing and releasing the initiative of people all down the line. We wanted their maximum contribution to company progress, their ideas as to every phase of our carry-on. If we succeeded, capitalizing in this way on the talents of hundreds of people instead of the few at the top, we would build greater security for employees and the stockholders, our bosses. Under this type of management, chief executives have to make clear the objectives, start the general course, and see that there are as few incidents as possible of some one blowing off the roof. We want to give men in every rank more authority than normally goes with their job. We want the push for new ways, greater freedom, to come *from the bottom up*. When visiting plants, the remark that gives me the greatest thrill is to hear some one say: "I am trying a new way—my idea."

Importance of Initiative

If I were twenty years younger, I would like to start all over again to set up a management where individuals all down the line would feel that they had an inherent right to try out their ideas. Feeling that way, people seldom go off half-cocked. Actually, more right decisions are



William B. Given, Jr.

made when those closest to the problem think it through, and act. You want them to feel that a percentage of errors is taken for granted. Of course, too many errors will drop a man from the team. But a good score fattens the envelope and opens the door to advancement. A feeling of freedom to fail is an essential in any company with ambition to advance. With this must go a conviction that it is proper to fight your boss, if necessary, for changes which, after careful thought, seem

to be steps forward. With such a purpose, you must see to it that there are only bosses who will accept—yes, welcome—honest difference of opinion from the men under them. Such men are the kind who get a great kick out of boasting about the men under them. Others don't fit at all in this kind of management; the omniscient must go.

A high degree of decentralization, giving greater authority to all ranks, has as a prerequisite the necessity of each boss making available to his own people a maximum of time each day. There must be sufficient time for the senior in such sessions to pass on his experience. The junior,

Address given before the Purchasing Agents Association of New York.

in turn, increases his boss's knowledge of local conditions, people, and plans. Everybody knows this, but too many managers are "too busy". I would recommend the replacement of those who cannot give their own people a sufficient amount of their time.

In the exchange of ideas there should be no indication of rank, no hesitancy on either side to be completely frank, and—if the job is properly carried on—there will be no hesitancy to discuss mistakes.

Vital Service Functions

Management units should be as small as the type of business makes possible. In the old days we were a company with many subsidiaries, each in a different business. There is now only one American corporation, with ten operating divisions, plus a Canadian set-up and a small plant in France. There is also what we call the Service Division, which tries to relieve the operating divisions of as many burdens as possible so they will have maximum time available to reduce cost, improve products, handle labor problems, and compete for a bigger portion of the going volume of orders.

In this division we offer the services of the Secretary and Treasurer Departments, a Construction and Maintenance set-up, and other help units such as Research, Labor Relations, Safety and Hygiene, Accounting. Here also is the General Purchasing Department.

These units only recommend to divisions, and where given the go-ahead, are under their supervision. If a recommendation is turned down, and if to them the division is seriously wrong, these units have the responsibility of giving either the President or First Vice President a chance to overrule the decision. Failure to submit the issue is taken seriously. In such case, no alibi is valid. This briefly outlines our objective in bottom-up management.

What Management Expects

The things I look for in purchasing management are pretty much the same as we expect in every section of our management. We want purchasing to take an increasingly important part in the company. We know it must be in the hands of the right kind of people.

Although never in actual purchasing work, I have frequently fought, bled, and at times nearly died with our purchasing people. In many periods I have boasted of their successes, especially in procurement during the war. In my period as

President, we have had four different men as head of the Purchasing Department. The first left the company, the second is now head of two of our operating divisions, the third is No. 2 man in another division, and the fourth, is Bill Old. As the record proves, in Brake Shoe we feel that purchasing experience is a good training school for general management jobs.

To us it seems that the qualifications needed in purchasing are the same qualities needed in sales. The man who is excellent as a salesman, nine times out of ten is just as good a buyer. Some companies, and some people in purchasing, do not realize this. Our objectives as to our relationship with other companies are the same in purchasing as in sales: to build up confidence in and respect for our company, to impart a knowledge of our policies, and, over-all, to make Brake Shoe a better company to deal with.

In decentralization, or bottom-up management as we call it, normally a purchasing department will play a more important part than it does in some other companies. It has a greater opportunity to influence policy if, in the judgment of the management, the people have proven they rate influence. It must be an offensive unit, rather than merely a part of the defense. With courage and common sense, its personnel will have a very important effect on earnings.

In a declining market, it should be fighting the operating departments for minimum inventories—trying to talk them into gambling on the short side—scaring out of them their fear that operations will suffer from production material shortages.

Gambling through Caution

Companies cannot afford any but courageous purchasing people. Excesses in purchasing cost the difference between the top prices paid at the end of the boom and near the bottom prices ahead. No thoughtful person can question that. Most presidents like figures. There will be no companies during the recession where presidents do not have accurate figures as to the cost of excess inventories at the time prices turned down. Also, they will have figures showing the cost of too slow reduction of inventories due to current purchases during the decline.

As an example, if we bought what proved to be 1,000 excess tons of scrap wheels when they were costing \$72 a ton, and the price continues declining to \$22, in my kind of arithmetic that 1,000 tons cost us

\$50,000 less profit taxes; 10,000 tons would cost one-half million dollars.

To me, the greatest ability is in the man who knows the spots as to which he lacks ability, and who has that high asset, the human instinct that leads him to the "right" men for advice on his weak spots. Too few able people know their own weaknesses. Too few select the right advisers on the different problems. Many in purchasing feel that they have to know everything about everything. That is impossible, and always was. There are no such people—or perhaps I should qualify it by saying that we never had one in Brake Shoe. But there are available people whose specialized knowledge is really specialized.

Too few realize that the cautious, by their cautions, are often business's greatest gamblers. Such men in purchasing are more expensive than anywhere else in the company.

The Long Range View

We can develop wisdom largely through our own mistakes and by learning from others of their mistakes. With wisdom, we know that good buying is not a question of lowest price. It is a question of what, in the long range, is best for the buyer—a question of what, in the long range, is the related cost.

Our own company's all-time high experience in this respect—the long range relationship of values—is happening now with a new product we are selling, and is a high tribute to the purchasing people in our customer companies. This experience has been with a product as to which neither our costs nor the value to the user are fully known. Many tons have been shipped without billing—the price to be settled when costs and value to the customer are finally on the table. That is a real relationship, based on mutual confidence.

With decent people representing good companies, complete frankness is the purchasing department's greatest asset. With others it is good too, but usually a waste of time.

In purchasing, all men should have the combination of initiative and courage. Both can be developed in most people who are competent. In reverse, complacency and caution—still worse, dumbness unrealized—are qualities which eliminate possible value in purchasing, as in any other department. Elasticity is a top quality, to adjust from a period of scarcity to one of excess supply.

To summarize, purchasing needs top grade people. It needs in its
(Please turn to page 314)

A Program Approach to Materials Management

● By Stanley E. Bryan
Associate Professor of Business Administration
Michigan State College

Orderly organization and coordination are essential to effective management.

Details should be put in their proper place and subordinated to the general plan.

Charting functions and factors aids in the development of good organization.

THE emphasis given to the subject of materials management at the Chicago Convention of N.A.P.A. represents a continuing recognition of the problem of planning, organizing, and controlling this important phase of manufacturing. Studies such as those of Holden, Fish, and Smith (*Top Management Organization and Control*, Stanford University Press, 1941) continue to show that few companies have developed effectively planned programs for the future or have utilized the known techniques in this regard. Faulty organization, failure to place fully qualified personnel in key positions, and lack of proper control methods are frequently the explanation for top executives not being able to concentrate upon developing a sound program for future needs.

A *program*, by dictionary definition, is an outline or order to be pursued. In a more general sense it is an underlying plan of action. An effective approach to such a program must be based upon knowledge pertaining to the field. Such knowledge must be accumulated and systematized with the express purpose of discovering general truths or principles if it is to be utilized effectively.

Philosophy of Management

The term *program approach* is used here to avoid the use of the word *philosophy*. The word *philosophy* is in good repute in management literature, but conflicts with accepted meanings of it found elsewhere. Such a program approach or philosophy presupposes the postulation of an inquiry which is larger than the day-to-day problems—it demands of us whether we are conducting our practices according to any set of principles or are merely snatching at floating straws.

One of the first books written on the general subject of economics of manufacturing was published as *The Philosophy of Manufactures* (By Alexander Ure) in 1835. A more recent work, which has been widely read and quoted in the field of industrial management, is Oliver Sheldon's *The Philosophy of Management*, published in 1930. The *Production Handbook* (L. P. Alford, Editor), which is standard literature in management, refers to the need for a philosophy as one of the cardinal principles of organization. It indicates that among the problems taken to consulting engineers are those which arise from "no clear-cut philosophy of management."

One such consultant pointed out that the primary operations, such as production and distribution, usually are well managed and properly organized; and the greatest weaknesses and extravagances are usually found in staff organizations and service departments, such as purchasing. It is significant that the Task Force Report on the Federal Supply System started with the introductory statement: "The problem of supply is treated all too casually by the United States Government." A similar criticism might be leveled at some industrial procurement. In summary, coordination of the various functions and factors is one of the ever present problems of management. There is need for

EXHIBIT A. MATRIX FOR THE WARP AND WOOF APPROACH TO MATERIALS MANAGEMENT

Function Factor Warp Woof	Materials Administration and Economic Research	Materials Procurement and Stores Control	Materials Transportation and Storage	Materials Conservation and Salvage	Materials Incoming Quality Control
Planned Purposes or Objectives					
Direction, Policies, and Executive Leadership			To be woven together with the aid of knowledge, experience and logic.		
Organization Structure and Functions					
Standards of Performance, Coordination and Control					
Principles Developed.					

**EXHIBIT B. AN ABBREVIATED ILLUSTRATION OF THE WARP AND WOOF
PROGRAM APPROACH TO MATERIALS MANAGEMENT**

FUNCTION WARP FACTOR WOOF	MATERIALS ADMINISTRATION AND ECONOMIC RESEARCH	MATERIALS PROCUREMENT AND STORES CONTROL	MATERIALS TRANSPORTATION AND STORAGE	MATERIALS CONSERVATION AND SALVAGE	MATERIALS INCOMING QUALITY CONTROL
	To have the right materials at the right place at the right time in the right quantity, consistent with the aims of economy and effectiveness.				
PLANNED PURPOSES OR OBJECTIVES	<ul style="list-style-type: none"> 1. Increased efficiency 2. Low per-unit cost 3. Usable economic analysis 4. Adequate records 	<ul style="list-style-type: none"> 1. Support manufacturing program 2. Minimum investment in inventories 3. Sound vendor relationships 4. Etc. 	<ul style="list-style-type: none"> 1. Move to right place 2. Safety of men 3. Protection of materials 4. Keep proper account of materials 5. Etc. 	<ul style="list-style-type: none"> 1. Reduction of waste 2. Standardize sizes and shapes 3. Reclaim material 4. Profit from sale of salvage 	<ul style="list-style-type: none"> 1. Protect company's quality standards 2. Effectuate quality coordination 3. Etc.
DIRECTION, POLICIES AND EXECUTIVE LEADERSHIP	Policies based upon careful consideration of purposes and ideals of the organization, complementary to related policies, known and understood. Evidence of mutual understanding and confidence of executives and personnel.				
ORGANIZATION STRUCTURE AND FUNCTIONS	<ul style="list-style-type: none"> 1. Centralized record keeping 2. A Policy, Organization, Procedures Manual 3. Liaison with other depts 4. Etc. 	<ul style="list-style-type: none"> 1. Inventory policy 2. Valuation methods 3. Purchasing prerogatives 4. Vendor Relation policy 5. Make or Buy? 6. Etc. 	<ul style="list-style-type: none"> 1. Centralized transportation dept? 2. Open-Closed stockrooms? 3. Equipment maintenance policy? 4. Issuing and receipt? 	<ul style="list-style-type: none"> 1. Segregation policy? 2. Periodic pick up? 3. Conservation campaigns? 4. Method of sale policy? 5. Clean-ups? 6. Etc. 	<ul style="list-style-type: none"> 1. Use of sampling 2. Sample plans 3. Relation to contracts 4. Method of handling rejections 5. Vendor relations
STANDARDS OF PERFOR- MANCE, COORDINA- TION, AND CONTROL	Organization structure built around functions and not individuals. Every proper function or phase of work recognized, granted existence and placed under proper executive direction and control.				
PRINCIPLES*	<ul style="list-style-type: none"> 1. Keeps records 2. Makes organization and procedures analyses 3. Conducts evaluations 4. Provides training 5. Liaison work 6. Economic studies, etc. 				
	Budget or fact control based upon statistical and non-statistical standards of performance, periodic audits, and constant communications. Coordination of various controls, not over-control by executives.				
	<ul style="list-style-type: none"> 1. Periodic Audits of policies, organization structure, and procedures 2. Number of units completed 3. Cost figures 4. Etc. 	<ul style="list-style-type: none"> 1. Value of purchases 2. Number of purchase orders 3. Number of Rush orders 4. Expediting costs 5. Inventory turn-overs 6. Etc. 	<ul style="list-style-type: none"> 1. Periodic inventories 2. Safety record 3. Damage figures 4. Housekeeping performance 5. Audits of methods of moving and storing 6. Shortages 7. Etc. 	<ul style="list-style-type: none"> 1. Salvage sales and returns to departments 2. Estimated savings from conservation activities 3. Audit of methods of pick up, sorting, etc. 	<ul style="list-style-type: none"> 1. Check inspection 2. Complaint records on quality 3. Percent defective figures 4. Audit of inspection procedures 5. Etc.
	Principles are general propositions sufficiently applicable to a series of functions under consideration to provide a guide to action. They are usually very general in their application.				
	<ul style="list-style-type: none"> Principles of: a. Planning b. Decision c. Analysis d. Records 	<ul style="list-style-type: none"> Principles of: e. Policies f. Ideals g. Situation h. Control 	<ul style="list-style-type: none"> Principles of: i. Flexibility j. Minimum movement k. Space use 	<ul style="list-style-type: none"> Principles of: l. Staff effectiveness m. Standardization 	<ul style="list-style-type: none"> Principles of: n. Upward trend o. Uniformity p. Inherent variability

PRINCIPLES DEVELOPED

*Refer to last section of chart (Exhibit B) on opposite page.

- a. **The Principle of Planning.** In order to effectively accomplish an objective there must be planning before doing.
- b. **The Principle of Decision.** Decisions should be based upon accurate information.
- c. **The Principle of Analysis.** Large problems must be broken down into smaller segments which can be segregated, assigned relative weight, and solved.
- d. **The Principle of Records.** Reliable immediate, and adequate records increase the efficiency of operations.
- e. **The Principle of Policies.** Definite, clean-cut policies are necessary for effective management.
- f. **The Principle of Ideals.** No form of organized activity can continue successfully over an extended period of time without maintaining certain minimum standards of conduct.
- g. **Principle of the Situation.** Successful solution of business problems depends upon the executive ability to determine the facts, have courage to face them, and follow the method they suggest.
- h. **Principle of Control.** Planning is of little value unless control is present to insure the carrying out of the plan.
- i. **Principle of Flexibility.** Economy in material movement is obtained by utilizing equipment and methods which are capable of a variety of uses.
- j. **Principle of Minimum Movement.** Movement of materials adds nothing of value in the manufacturing process and thus should be reduced to a minimum.
- k. **Principle of the Use of Space.** Effective utilization of space includes cubicle stacking, ceiling utilization, and definite location records.
- l. **Principle of Staff Proportional Effectiveness.** In order that the line functions may be performed with maximum economy and effectiveness, the service staff functions must often be performed with less than maximum economy and effectiveness.
- m. **Principle of Standardization.** Development of standard designs, types, sizes, and characteristics of material improve operations.
- n. **Principle of Upward Trend of Quality.** Quality is a variable with an upward trend under conditions of competitive manufacture.
- o. **Principle of Uniformity.** Uniformity of product and material is the root of production economy.
- p. **Principle of Inherent Variability.** Manufacturing materials are inherently variable in quality characteristics, and even when controlled will vary within certain limits; but quality is always tending to slip away from standard if not controlled.

more over-all study in the general problem of coordination, and especially so concerning the organizational interrelationships created in performing the materials supply functions. There appears to be a real need for a positive program approach aimed at integrating all the materials functions and factors into a unified whole.

Approaching the Problem

Perhaps the greatest difficulty in developing a program approach to materials management is in keeping the whole picture in proper focus to keep coordination, and not details, uppermost in importance. There are several approaches which might be recognized. For purposes of classification they are listed as follows:

- Serialized Procurement
- Vendor Relationships
- The Factors approach
- The Functions approach
- The Principles approach
- The Warp and Woof approach

Serialized Procurement. Professor H. T. Lewis, in his *Procurement*, approaches the study of supply by considering the functions to be performed as a series of steps. He describes it as "serialized procurement." His study starts with the determining of the proper amount to buy and ends with the settlement of the vendor's claims.

C. S. Rindsfoos, who probably wrote the first organized general treatise on the subject, which was called *Purchasing* and published in 1915, used the same general approach, as did H. H. Farquhar in *Factory Storeskeeping*, written in 1922.

Vendor Relationships. Professor E. H. Schell, writing *The Scope of the Purchasing Functions* in 1935 approached the general problem of supply by organizing his approach around the importance of vendor contacts and how the various functions fitted into these "vendor relationships." Stores and Inspection would not be included as they are not specifically related to strengthening vendor relationships.

The Factors Approach. Heinritz, in his text on Purchasing in 1947, approaches the problem of supply by considering in orderly fashion such factors as organization, principles, procedures, tools, and policies. Heinritz describes this as a *functional* approach. In doing so, however, he uses a different concept of *function* than that used below. He uses the term in the sense of a responsibility or purpose. By *function* is here meant a phase of work.

The Functions Approach. Professor R. C. Davis used the *functions* to carry his approach to a discussion of supply in *Purchasing and Storing*, published in 1931.

The Principles Approach. Gushee and Boffey in *Scientific Purchasing* presented an approach by the enumeration of principles, and indicated a need for fundamentals rather than routines. The consideration of principles is also found in such studies as those of Murphy (*The Fundamental Principles of Purchasing*), Hysell (*The Science of Purchasing*), Heinritz (*Basic Principles of Purchasing*), and to some extent in the studies of Twyford (*Purchasing, Its Economic Aspects and Proper Methods*), and Cady (*Industrial Purchasing*).

The Warp and Woof Approach. Each of the foregoing approaches has its merits. However, none of them stresses coordination of the functions and factors by presenting them in a way to indicate a unified whole. The approach proposed here, and believed to be original, is the development of a program of materials management through a warp and woof approach.

It is suggested here that the most effective way of presenting an integrated program approach to materials management is in the form of a tapestry, with unifying or coordinating strands tying it together. A tapestry is a well-knit fabric made up of warp tied with woof. Here is to be presented a tapestry of materials management with the functions as warp, tied together with the factors as woof.

Functions Included in Materials Management

Materials Management includes numerous functions and there is no general agreement as to which functions should be logically included in the organization for supply. However, consideration of the normal span of attention or control would tend to limit the number of general functions to be included to a maximum of approximately five or six. Careful consideration of five general functions which are important in reaching the objective of the materials organization has led to the inclusion of the following:

- Materials Administration and Economic Research
- Materials Procurement and Stores Control
- Materials Transportation and Storage
- Materials Conservation and Salvage

(Please turn to page 310)



Good Buy, Mr. Chips

How much does it cost you to manufacture chips in a machining operation?

The cutting tool is the most important and least expensive factor.

Properly selected tools cut costs as well as cutting steel.

By W. G. Robbins, President

Carboloy Company, Inc.
Detroit, Michigan

ONE of the hardest things to remember when you have to produce a product that requires machining is that you have to start with the cutting tool you are going to use. Correct machine tool selection, correct jig and fixture design, are highly important in their relation to minimum production costs—but the cutting tool still has to do the work.

It is surprising how much money can be saved by giving sufficient consideration to the selection of cutting tools—or lost by neglecting to

do so. Just because a tool can "cut" doesn't mean that it's the right tool for the job.

Another thing—of all the factors to be considered in selecting a tool to perform any operation, the initial cost frequently is the least important, since it represents the smallest expenditure the plant makes in connection with that tool.

Obviously this doesn't mean that the highest priced tool is necessarily the best. Quite often a lower priced standard tool will do just as good a

job as—or perhaps better than—a higher priced special tool. What is this job, and how can we cut manufacturing costs through tool selection?

Well, first of all, the job of any tool is to produce chips—chips, and more chips. The finish-machined product is simply what is left over after we have manufactured a lot of chips. So the first thing we have to look for is the kind of tool that will produce the most chips of the right kind for the least amount of money.

This means that the tool should be able to cut fast. It means that the tool ought to be able to take a big bite when a big bite is the thing to take. It means that the tool ought to be able to take little bites—fine feeds—when we want to produce a finely finished surface on the piece that's left over.

It means that the tool should be able to stay on the job just as long as possible without having to take time out for sharpening. It can't produce chips when it's in the tool room for a regrind. And every time you have to take a tool out of a machine and put in another one, production time is lost, both for the machine and the operator. Check up how long it takes to change tools and reset your machines, multiply that by the number of tool changes and by the dollars per hour your ma-

(Please turn to page 312)

A Purchasing Policy Manual

● By J. E. Bedford

Assistant Professor of Merchandising
Armstrong College
Berkeley, California

Why the purchasing department should commit its policies to writing.

How to compile a manual for greatest value and effectiveness.

How to use a manual as an administrative tool in department operation.



WHEN the plans were completed for the new model in the production department the purchasing department swung into action. Requests for quotations went out, vendors were checked, salesmen called, and all in all activity in the department was at a high pitch.

To handle the extra detail work it was necessary to call in extra help to handle the heavy work load. Some of the personnel was transferred from other departments and some were new to the organization. But they were all faced with a common problem—they didn't know what to do.

What should they do about this? Is this the correct way to handle this? Whom should I see about this? When should I follow up this matter? How should this form be handled? How many copies of this should I make?

Questions like these came from all of the new employees and in some cases these newcomers to the department got conflicting answers from some of the older employees.

Confusion instead of cooperation seemed to be the keynote of all the extra activity in the purchasing department. It made the work more difficult for everyone and nerves were almost razor sharp by the time the final order had been placed for the new model's requirements.

When the activity had subsided a little and things were back to normal operations, the Purchasing Agent decided to try to eliminate a repeat performance when the models were changed again. He wanted to make the work easier for everyone in the department and he wanted to make the work move through the department in the most efficient manner.

To accomplish this objective he set up a purchasing department policy manual. This required a great

deal of planning and paper work, but as a result things were handled much more efficiently and the former confusion that existed was eliminated when the next new model was announced.

With all of the procedures in the purchasing department reduced to a standard it was possible to help the newcomers in the department understand what should be done. If, for instance, one of the new employees was in doubt about some way to handle a form, he could check the policy manual without disturbing half a dozen other employees trying to find out the correct method.

Training new employees was made a simple matter and they were better qualified than they had ever been before. When transfers were necessary due to illness or vacations it made the system more flexible and eliminated most of the common errors made by new people in the department.

Among some of the other advantages that the purchasing department policy manual made possible were: (1) it provided a basis for developing a rating system for the department; (2) it made the policy clearer to all concerned; (3) it made the whole organization more efficient and (4) it helped the other departments understand and appreciate the work of the purchasing department.

Preparing a purchasing department manual is no small task for any purchasing agent. It takes time—often time spent away from the office. Constant checking of every detail, conferences with other departments affected, and then organizing and writing the manual, will consume hours.

But even with all of this work, there are some very definite benefits that do accrue to the purchasing agent who sets up a policy manual for his department. It makes the work of the purchasing department easier and more efficient when the work of the manual is completed.

While the purchasing agent is working to prepare the manual he is bound to learn and clarify in his own mind all of the ramifications of his department's operations. It is not at all unlikely that such a thorough analysis of the procedures and policies will reveal some duplication of work that is taking place. Short cuts and streamline operation is made possible when everything is reduced to the black and white form of a purchasing department policy manual.

Here are seven things that will help reduce the work involved in preparing a purchasing department policy manual. They assure coverage of all aspects of the department and they should make the job of preparation complete—but easy.

1. Review Other Company's Manuals

It is a great aid if the purchasing agent has access to some other company's policy manual to use as a guide in preparing his own. If it isn't possible to obtain a manual from some other company it might be possible to review some of the policy manuals of other departments to obtain some ideas on the information included.

If some other company's policy manual is used for a review it should be used merely as a guide. Following the same plan some other company has adopted will probably make the job more difficult because every company is faced with different problems. It can, however, be used as a guide and to get some ideas about the organization that will prove the most effective.

2. Prepare Section by Section

Writing a purchasing department policy manual seems like a stupendous task when first considered. But, if it is prepared section by section the job doesn't seem near as difficult and it will be much more complete when it is completed. Every detail that will affect each section of the manual should be considered as the information is being accumulated.

If the information is prepared in a rough draft form as it is accumulated for each section, additions and corrections can be made without too much difficulty. It is easier to concentrate on one section of the manual or one problem on policy at a time. Then the results will be well worth the effort required in dividing the work up into sections.

3. Encourage Cooperation of Everyone

A purchasing agent could prepare the policy manual for his department without any cooperation. He could do the job because he is the best qualified to handle this work. But, if all of the work is done by one individual it will not be as effective, and it will be too much work for the already busy purchasing agent.

To be 100% effective the purchasing department policy manual has to be used after it is prepared. If everyone in the department has a hand in its preparation they will be much more interested in abiding by the rules laid down in the manual. Suggestions that are presented and used by the one preparing the manual will go a long way to weld the organization into a unified operating unit.

4. Discuss the Sections on Completion

As each section is completed in rough form it should be thoroughly discussed with everyone in the department. This will serve to discover any errors that have crept into the manual undetected by the purchasing agent. It may be that some section of the department has been handling a particular form in another way than the one specified in the manual because it saves them time and accomplishes the same purpose.

Any modifications that should be made can be discussed at this time, before the manual is reproduced in its final form. Some suggestions made at this time will save a great deal of time later on in the revision of the manual and will be much easier to accomplish during the discussion than to wait until it has been set up as a standard procedure for the purchasing department.

5. Provide for Revisions

Regardless of how well the plans are made for any policy manual, certain revisions will be necessary from time to time. When preparing the purchasing department manual most purchasing agents will make some provisions for revisions that are bound to occur. The proper form that these revisions will take is usually included in some section of the manual with the requirements of who is to make the approval, when the changes must be reported, and any special procedures that may be included in the manual for some short emergency.

To make the revision as easy as possible it is usually advisable to bind the manual in a loose leaf binder. This makes it possible to change one page without altering the whole book. When it is necessary to revise some standard procedure it can be included in an extra sheet and inserted in the proper place. If some new plan is being tried out before being made a definite part of the standard procedure a memo to this effect can be included in the proper section of the manual while the experiment on the new procedure is being conducted.

6. Get Top Management Approval

Since the purchasing department policy manual is to be used as a handbook of rules for the operation of the department, it will be better accepted by everyone if it has the endorsement of top management. A brief foreword written by the president will often work wonders in getting the manual accepted as a rule

book by all of the employees in the department.

Another advantage to the purchasing agent in getting top management approval of the policy manual is the fact that it shows the ability the purchasing agent has in establishing certain rules and regulations for the most efficient operation of his phase of the business. It will give top management a bird's-eye view of the many and varied duties of the purchasing agent. Then, too, the preparation of the manual will demonstrate the purchasing agent's details.

7. Present the Finished Manual to Everyone

Both old and new employees will be better able to do the job required of them if they are given a complete review of the finished purchasing department policy manual. It will help them better understand their jobs and they won't have any doubts about any phase of their responsibilities. They will be better able to help new employees in the department handle some of the routine duties.

Some purchasing agents have found that this presentation is worth the effort because it will point out subtly that some of the older employees are not following the correct procedure. It serves as a method of review that doesn't cause any internal friction in the purchasing department because it is impersonal and applies to all.

Another thing that some purchasing agents do is to make minor changes in the policy or procedure from time to time after the standard has been established. The manual is a reminder to avoid deviations without due cause. But if the change is necessary or desirable, this gives them another chance to review the manual with all of the employees and to check up on their handling of things that have remained the same.

These seven points won't cover all of the problems that will arise in the purchasing department in preparing the policy manual. Every business has its own individual problems, but these points should help point the way to some of the more important things that should be covered in organizing, preparing, and writing the policy manual.

Any effort made to eliminate the confusion that exists around the purchasing department during a rush period will help . . . and a purchasing department policy manual will establish a standard way of doing things . . . the right way.

Using the Customer as a Supply Line

**When sheet steel supply sources ran dry,
Lyon looked to its customers.**

**How one company increased production at
the depth of the steel shortage.**

**Customers got needed products by digging
up 45 million pounds of metal.**

THE problem of maintaining supplies and production in the face of severe postwar shortages of key materials produced many examples of ingenuity and resourcefulness in procurement. Now that the easing of those shortages has brought conditions more nearly back to normal, a part of that story can be told, with the figures to show how effective some of those programs proved to be. One of the outstanding instances is found in the experience of Lyon Metal Incorporated, of Aurora, Illinois.

A little more than two years ago, the Lyon company, manufacturers of a wide range of sheet steel products, was apparently up against a stone wall in the procurement of its essential raw material. There was plenty of demand for its products, and that demand was increasing, but sheet steel was among the shortest of all materials then in short supply.

The amount of steel which the company received on the basis of 1946 allocation schedules dwindled rapidly as the mills cut back in order to handle government "must" programs. Then the Eastern mills, upon which Lyon depended for approximately 15% of its prewar sheet steel requirements, discontinued all shipments to mid-western customers. It was apparent that a continuance of such severe shortage of its basic commodity would force the company to curtail production drastically, going to a shorter work week and laying off many of its employees in the process.

This was the critical situation which faced Lyon executives and prompted innumerable "what to do" meetings. Out of these sessions came the "horse trading" idea that ultimately produced results far beyond the original expectations.

There was nothing particularly involved or complicated about the plan. The technique of "swapping"

was as old as commerce itself. The unique feature of this project was the large scale application of that technique as a basic company policy, and the success with which it was carried out. Throughout industry, buyers of fabricated metal parts were being forced reluctantly to furnish all or part of the component steel in order to secure the manufacture and delivery of the needed parts. Why not apply this principle from the sales angle? Lyon embarked upon a program that revolved around the proposition: "You furnish the steel—Lyon will make the product."

This became the company's unceasing battle cry for more than two years. Salesmen preached the idea to their industrial, commercial, and institutional customers and prospects. Lyon dealers were indoctrinated through special meetings. Lyon's advertising in business and trade publications hammered away, month after month, always with this same approach and the same slogan.

Through salesmen's calls, space advertising, and consistent direct mail programs, customers and prospective customers were told:

"We can make prompt delivery on Lyon products if you will furnish us with the sheet steel. We will buy the steel from you and ship the pound-for-pound equivalent in either standard Lyon products at regular published prices or special items made to your specifications."

The idea of the customer furnishing the steel wasn't easy to sell—at first. Customers had other uses for this hard-to-get material too. Lyon salesmen and dealers were on the receiving end of a lot of razzing when they broached the "horse trading"

proposition. However, it took less than three months to show the Lyon management that they were on the right track. Perhaps there wasn't "gold in them thar hills", but there was something far more precious—there was steel, and a surprising lot of it.

Now that this technique has served its purpose, the company has disclosed the results achieved, in terms of some very enlightening facts and figures. During this two-year drive, 45 million pounds of customer-furnished steel was secured. At the height of the shortage, more than 17 million pounds were secured in 1947, and close to another 17 million pounds in 1948. This additional tonnage enabled Lyon to make 31.48% additional net shipments in 1947; 29.7% in 1948.

It also provided a full year's employment for 322 workers in 1947, who otherwise would have been off the payroll. It did the same for 308 workers in 1948. Most eye-opening of all the result figures is this: customer-furnished steel accounted for 54% of the company's net profit dollars in 1947; 52% in 1948.

Where this customer-furnished steel came from is an interesting story in itself.

In Los Angeles, for example, a dealer had a friend who had a friend in Detroit, who produced 80,000 pounds.

The President of a School Board found a board member who could produce 40 tons for locker requirements.

Dealers in Kansas City got steel from scattered points—from Phila-
(Please turn to page 328)

Island Economy Creates Purchasing Problems

(Photographs by courtesy of the Hamilton Wright Organization, Inc.)



Puerto Rico Cement Company plant near Catano—focal unit in the Island's industrial growth—produces 1,000,000 barrels a year, used for building new highways, new factories, new homes.

By A. N. Wecksler

Puerto Rico must buy; being dependent on imports of manufactured goods.

Purchasing agents have important role in administering economic controls.

Government encourages industrial projects, welcomes private enterprise.

ONE area of the world that is acutely conscious that it has a problem is Puerto Rico—and because it is United States territory, the problem has increasingly become a matter of primary importance to our government.

The United States, over a long period of time, has endeavored to aid Puerto Rico . . . large sums are

spent in the islands by the armed force, and there have been various Government programs for schooling, for aid to war veterans and road construction, all of which funnel Federal funds to the islanders.

But it has been an uneven race, mainly because the population growth in the islands has been phenomenal and constant, while the

Government aid programs have been sporadic.

One complicating factor until recently was the administration of the island, under which Governors were appointed by the President of the United States. These appointments brought to Puerto Rico a variety of administrators, whose administrative ideas ranged from military ex-

actitude to erratic experimentation—the latter influence during the administration of former Governor Rexford Guy Tugwell. The appointed Governors brought their varied ideas with them and sought to superimpose these ideas on the islanders.

Now the island elects its own Governor, and the problem is more immediate than during previous periods of its history. Reason is that the present Governor Luis Munoz Marin—Puerto Rico's first elected Governor—is an energetic and consummate political leader, highly

dramatic and vocal, who will keep the island's problems in the lime-light. His approach will make some solution necessary.

A Controlled Economy

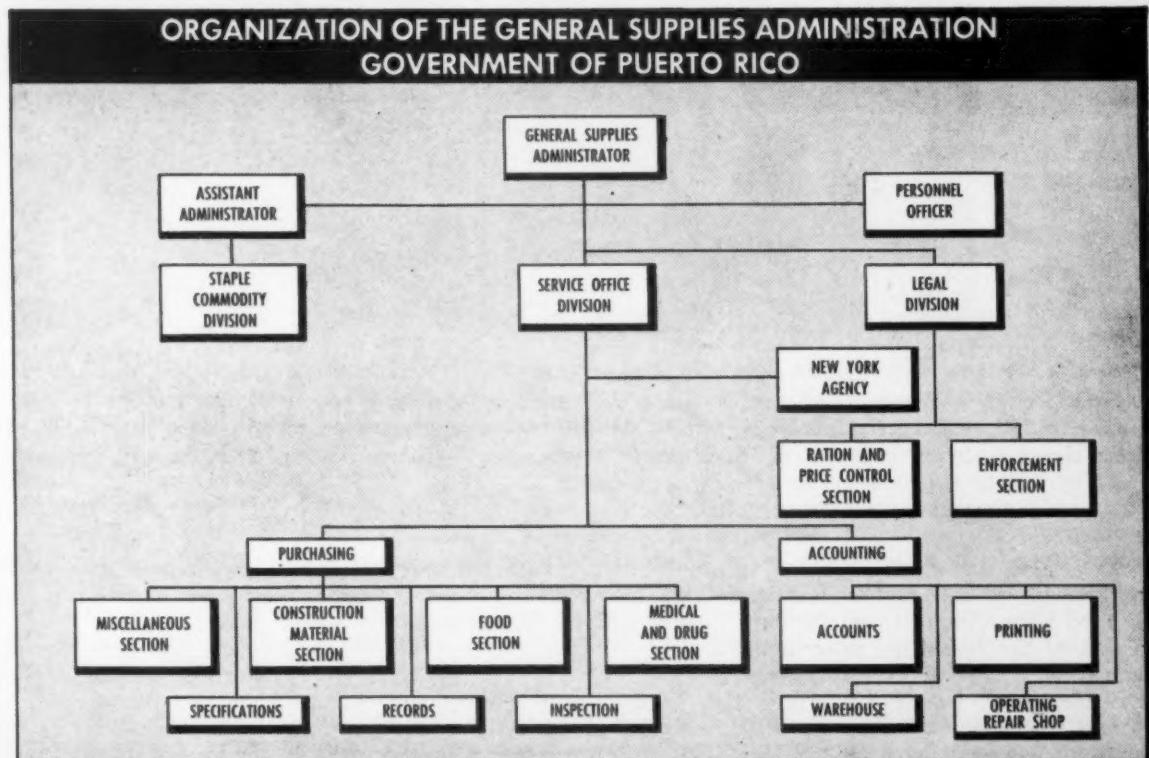
There are many facets to Puerto Rico's problem. Among these are the fact that now, more than four years after the war, the island of Puerto Rico still retains some of the commodity and price controls which have long since been discarded on the mainland of the United States.

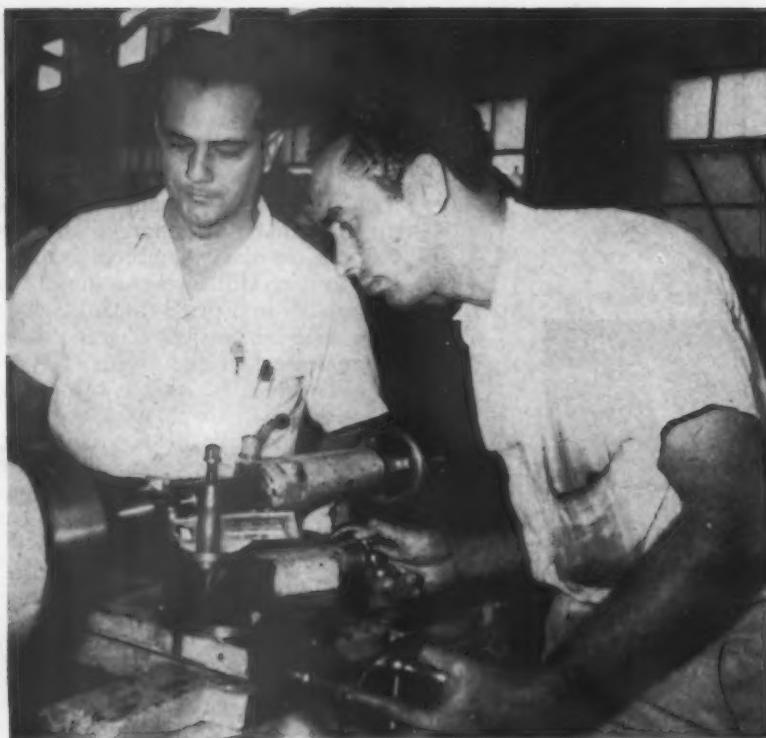
Justification for this is the island deficiency in many staples of food, and the inability of the island to trade off its crops of sugar and production of rum, on an uncontrolled market basis, for a sufficient quantity of imported petroleum products and food staples required to sustain the crowded island population.

Of interest to the purchasing agent is the fact that these control functions are either exercised or advised by Puerto Rican purchasing agents. Another feature of interest is that the island purchasing agents have modeled their practices and procedures after those of the Bureau of Federal Supply.

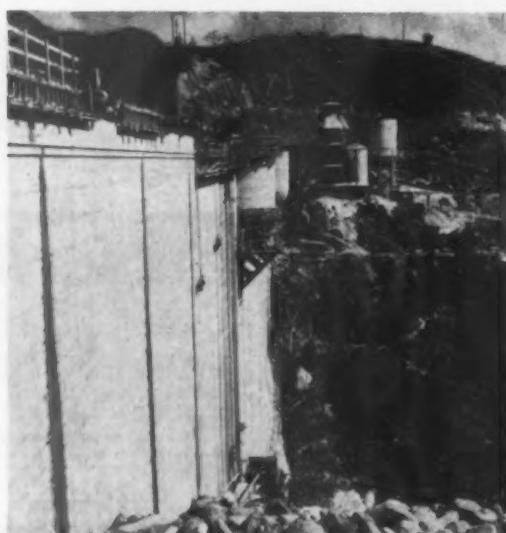


Antonio Vicens Rios, General Supplies Administrator of the Government of Puerto Rico, who functions in the dual capacity as Government Purchasing Agent and as Price and Commodity Administrator.

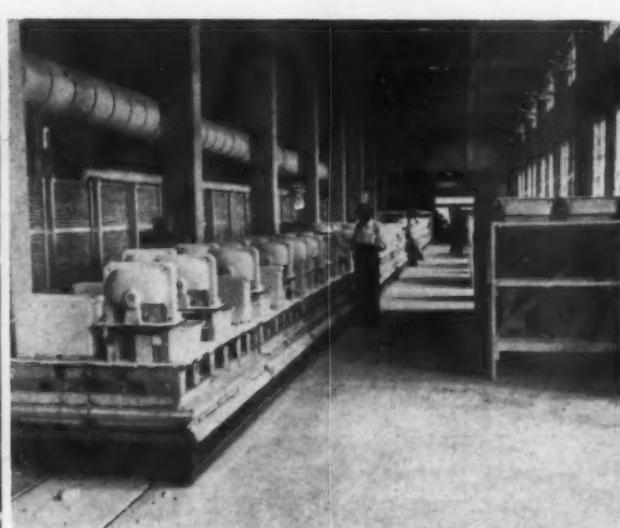




The University of Puerto Rico maintains the world's largest vocational training school, with 3,500 students learning fifty different trades. Its graduates are in demand throughout Latin America.



Power for Puerto Rico industry—the Caonillas hydroelectric project, a "Junior TVA" has increased available power to 500 million KWH per year, freeing the Island from dependence on imported oil as a power source.



Assembly line technique is applied at the Puerto Rico Clay Products Company in the production of sanitary equipment, along with its hollow tile, roofing tile, and common brick for the housing program.

It is also noteworthy that as an outgrowth of the war economy in Puerto Rico, much of the economic assets of the island are now in the hands of the insular Government; however, the island Government would like to see private enterprise step in wherever possible to take

over and expand industry, rather than to extend the scope of Government activity in business.

Private Enterprise Encouraged

This objective is not entirely unselfish. It is fully apparent that Puerto Rico requires the know-how

of production, which its own Government personnel cannot supply. Also the high wartime tax yields derived from the sale of Puerto Rican rum on the U. S. market from 1943 through 1946 have been expended, and rum sales, though now increasing, are at a much lower volume than even the prewar marketing of rum in the States. This tax yield financed much of the Government's industrialization program.

As a result, the Government does not have the economic resources to extend its industrial operations, but at the same time the island authorities maintain that only through expansion of industry can the island economy be stabilized.

To attract private capital, the Government of the island has offered exemption to certain new industries from both island and U. S. Federal Government income taxes for a period of 12 years. In addition, the island Government offers a number of other aids and inducements for new industry.

One of these inducements is a lower wage scale for Puerto Rican labor, and it is at this point that the

import and price control system of the island is of paramount importance.

The low wage scale of a large portion of Puerto Rican labor, and the fact that a considerable number of the Puerto Rican populace cannot find employment at adequate wages,

combine to make it essential that important fuels and foods going into the cost of living be price regulated.

A dramatic example of this is the price ceiling on such a food item as salted New England codfish. Tracing back to the days when Puerto Rican-produced molasses and rum were shipped to New England and traded for codfish, this food has been a staple of the Puerto Rican diet for consumers in the lower economic brackets.

The conditions of restricted shipping during the war made it necessary to ration codfish and to control the price. During the postwar price rises, it was necessary to retain the price ceilings so that price levels would not price the islanders out of the market for one of the staples of diet.

So the Government regulates the price of salted codfish—also of petroleum products, coffee, bread, meat, rice, Mexican beans, and milk.

General Supplies Administration

The Government department that administers these control activities

island's school lunch program, and at the same time also establishes the price ceilings for many of these products. So in effect the purchasing agents are instrumental in setting the prices at which they will buy.

However, the prices are not set on an arbitrary basis. The importers and distributors are consulted, and reasonable profit margins are allowed in setting the prices.

Electric Utilities

Another wartime island development that has left a strong postwar pattern is the assumption by the Government of all electric power control in Puerto Rico.

The factors were that when the war began, the distribution of electric power was in the hands of private companies, even though the Government of the Island had developed hydroelectric power projects. The private utilities companies were reticent about buying power from the Government generating plants, preferring to sell power generated from their own steam generating plants.

in considerably reduced use of petroleum for fuel.

After the two-year period of Federal operation, the Water Resources Authority (a Government corporation generally modeled after TVA) took over and purchased the assets of the electric power distributing companies.

As a result, the Water Resources Authority became the producer and the marketer of electric power. This Government corporation sells electric power to industrial and private consumers, billing a total of more than 170,000 customers each month. Government-owned plants buy Government-owned power. At the same time, the Water Resources Authority is one of the more important customers of the Government-owned cement plant—another instance of where the government is a large purchaser of its own production.

Industrial Program

Peculiarly enough, these Government inter-relationships, while seemingly inimical to private enterprise, seek to be completely the reverse. The Government policy is to stimulate private business, and will make all types of concessions to bring new industry into the island.

The seeming contradiction of considerable Government penetration into industry and the desire to attract more private business is explained by the fact that private risk capital could not undertake the hazards of establishing basic industries in Puerto Rico as a first step toward further industrialization.

Provides Gainful Employment

The Government of the Island felt that such industrialization is a prime necessity as a means of providing gainful employment for the people, and decided that the situation was sufficiently grave to expend its wartime bounty or huge tax revenues derived from the sale of rum, for establishment of a glass plant, a tile plant, shoe manufacturing, textiles production, and such similar enterprises.

With these plants in being—and an extensive program of training labor for plant work—the Government feels that it has planted the seed corn for industrialization, and wants private initiative and experience to start new plants, and in some cases to take over the management of some of the existing plants which are currently owned and operated by the Government.



The shoe factory has already developed a small but growing export trade to South America. Its more than 300 workers have all been trained on the job.

is the General Supplies Administration, which also functions for the Puerto Rican Government in the same manner as does the Bureau of Federal Supply for U. S. Government.

This agency buys the milk, meat and vegetable products for the

At the outbreak of the war, due to the necessity of conserving shipping, the Federal Government took over the utilities and operated them for two years, discontinuing use of the steam plants whenever possible and substituting power from the hydroelectric projects. This resulted

STANDARD OIL COMPANY OF CALIFORNIA

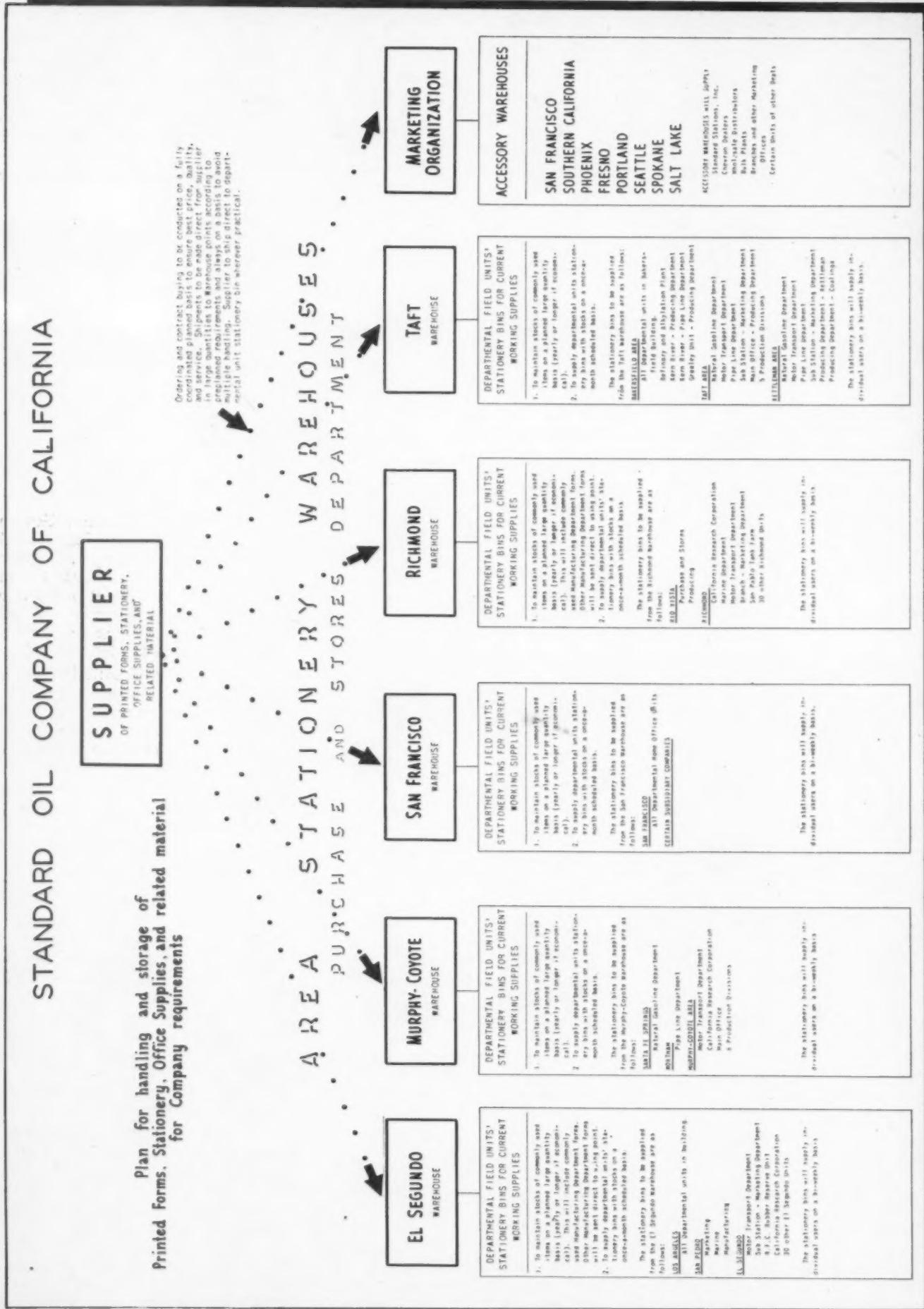


FIGURE 1. THE BASIC PLAN

Handling and Storing Office Forms and Supplies

By Joseph W. Lucas

Organization Counsel
Department on Organization
Standard Oil Co. of California

Stationery supplies are a \$1,500,000 item for Standard Oil Company of California.

Working stocks are maintained at 20 warehouses to serve all departments and stations.

How the Purchasing Department functions in a comprehensive, coordinated supply system.

The large scale business enterprise of today will consume, in the course of one year, hundreds of thousands of pounds of office forms, office supplies, and paper. Expenditures are also measured in hundreds of thousands of dollars, represented not only by amounts paid printers, stationers, and paper firms, but also by the cost of handling, storing, and shipping.

Many business organizations are engaged continually in conducting surveys related to overhauling and modernizing their warehousing and materials handling techniques, and buying and planning practices. These surveys are often concerned solely with products and operating materials, although cost reduction possibilities are applicable equally to stationery. Furthermore, stationery is as much an integral part of a company's operations as any commodity such as resale stocks and operating supply items.

Realizing the magnitude of the stationery activity and the opportunities for further economies, Standard Oil Company of California undertook a complete review of its stationery handling, storing, and purchasing methods in the latter part of 1948. The cost of office forms and office supplies, which comprises more than 5,000 different items, approximates \$1,500,000 yearly at Standard of California.

As a result of this survey, recommendations were made to improve present practices as indicated by the following:

1. Facilitate large quantity buying on well-established printed forms and commonly used stationery items to obtain more attractive prices.

2. Synchronize carload shipments of paper to meet schedules.

3. Reduce frequency of purchase orders and the cost of purchasing.

4. Utilize economical available space at outlying points.

5. Substitute mechanical handling of bulk stocks for manual handling, where the volume of activity justifies the expenditure for equipment.

6. Provide better control over stocks through minimizing the possibility of many divisions or units overstocking. Decentralization of stocks, centralization of control, and standard check list order forms are designed to accomplish this. Local stockmen will have on-the-ground knowledge of operating conditions and will give careful attention to usage.

7. Reduce transportation expense.

8. Eliminate duplicate handling through direct shipments to either the warehouse points or the ordering units of large preplanned requirements from suppliers.

9. Reduce receiving, shipping, and accounting expense.

10. Reduce packing and shipping supplies expense.

11. Provide more economical space for bulk storage of paper direct from the mill.

12. Minimize the necessity of interim orders placed between pre-established ordering dates.

13. Improve service and provide convenience for obtaining supplies.

14. Schedule staggered ordering dates for ordering points to equalize work loads.

Prior to the survey, Standard of California had a centralized ware-

Shipping area of warehouse. Orders are filled from storage bins, and bulk stocks are stored on pallets and skid racks.



STATIONERY REQUISITION PD-219						
To Purchase and Stores Department		STATIONERY REQUISITION PD-219				
Location: 620 BEACH STREET, SAN FRANCISCO, CALIFORNIA						
Ship to: Natural Gasoline Department		Date: _____				
Destination: Room 415, 225 Bush St. S.F.						
QUANTITY	UNIT	FORM NO. OR SIZE	DESCRIPTION	REG.	EST. A.O. REQUANT.	ON HAND
box of 100	" 1		Clips, Gem - Large	10	2	
box of 100	" 3		Clips Gem - Small	10	4	
box of 6 doz	" 2		Pencils with rubber tip.		2	
box of 6 doz	" 3		" " "		1	
box of 100	60-185		Plant Inventory	5	3	
PKG			is U.O.G Inter Co.			
of 500	60-499-2		Envelope	-	1	
PKG	NG-32		Statement of Gas Processed	500	5	
PKG	NG-32-1		District Record " " "	500	2	
PKG	NG-47		Gas Record	500	1/4	
loose cards	NG-63		Investment Record	500	30	

Special Instructions where applicable for this check list:

*Do not order more frequently than once each month
Order between the 1st & 7th of each month as per Mr G. F
Gephart's letter of March 20, 1946.*

Approved: _____

PD-219 (SD-12-6)

Figure 2. Standardized type of check list for replenishment of current working supplies from warehouse stocks.

house arrangement. Located in San Francisco near the Home Office, this warehouse served all departments and many subsidiaries in western states as well as certain foreign and other units outside the western area. Several thousand service stations were also served from this warehouse.

The new arrangement, adopted as a result of the survey, utilizes Company warehouse facilities in the field for storing bulk quantities for currently and conveniently replenishing local units' stationery bins with working supplies. This plan ensures full realization of economics mentioned above and as described in more detail herein under appropriate sections.

The Basic Plan

As indicated in Figure 1, the basic plan is to move stocks directly from suppliers (printers, stationers, and others) to the decentralized warehouse points, or to the actual field units' stationery bins if space is available, in large quantities, on a fully coordinated basis of pre-

planned requirements. Thus the desired objectives are to ship in large quantities from suppliers, obtain best prices commensurate with quality required, utilize available space, and keep all costs at a minimum without multiple handling and costly transportation. This is on a basis to meet field requirements locally in the most economical, convenient, and practical manner.

Decentralization further provides the opportunity for the Company to purchase its stationery from local vendors who are situated near warehouse points, in keeping with its policy to buy locally wherever possible.

The plan established five principal warehouse points which are operated by the Purchase and Stores Department. Stationery is stored and handled in a manner similar to any operating supply item such as pipe, tubing, and nails. That is, the stationery bins of operating departments and others are replenished on a current basis from the local central warehouse.

Within the Marketing Organiza-

tion advantage is also taken of available space in warehouses established for storing automotive accessories so as to supply conveniently service stations and other marketing units.

Functions of the Purchasing Department

From the economy standpoint, an organization will be well rewarded in giving thorough study to all warehousing, transportation, and other costs involved; and in conducting purchasing with full emphasis on preplanned requirements in large quantities and ensuring that the Company obtains best prices, consistent with quality, and service. In short, a desired objective is the determination of an economic ordering quantity for every item.

It should be mentioned at this point that Standard of California requests quotations and contracts with vendors for practically all of its stationery requirements. Perhaps 10% of the total cost of office forms are of the non-complicated

variety with such small quantity runs required that they can be reproduced easily and economically by ordinary office equipment such as the mimeograph.

The purchasing department is usually the best qualified and equipped to undertake the coordination of purchasing and related activities for the organization as a whole. A close relationship between the various departments and the purchasing department is needed as the latter is established to counsel with other departments as to prices, quality, and service and see that sufficient space is maintained to accomplish desired results.

Briefly, a purchasing department should perform the following principal functions with respect to stationery:

1. Coordinate space, buying, and other requirements to the end that the organization is ensured of all economies.

2. Advise departments of prices on various quantities. Final determination of quantities should rest with the individual department, which is usually the best qualified to determine long range requirements and possible obsolescence losses.

3. Obtain sufficient quotations, negotiate contracts, and place orders with vendors in accordance with final determination by departments of their requirements. Have suppliers ship direct to warehouses or ordering points according to shipping instructions. Preplan requirements with departments.

4. Maintain a record of quantities of each item sent to each warehouse point

5. Maintain a record of prices and quantities on each order placed with vendors.

6. Purchase paper in carload lots direct from the mill, whenever it appears economical.

7. Review monthly inventory lists prepared by warehouses to follow usage and adjust inventories.

8. Maintain the Stationery Supplies Catalog and counsel with departments on maintenance of check list ordering forms.

9. Maintain stationery stocks at warehouse points.

10. Advise and counsel with departments that maintain warehouse stocks.

Through preplanning requirements and purchasing in larger quantities the number of purchase orders placed and invoices processed can be reduced materially.

Warehousing and Transportation

The basic plan establishes five area stationery warehouses in the field. Stationery bins and skid racks, if necessary, are provided at Accessory Warehouses of the Marketing Organization so that service stations and other marketing units can be supplied directly from local points. This provides the opportunity of realizing greater savings through utilizing fully the cubic storage areas and combining stationery shipments with accessories. Utilization of cubic storage area is accomplished by providing skid racks, pallets, and mechanical handling equipment.

The photographs herewith show the Southern California Accessory Warehouse both before and after

installing the necessary equipment. The "after" photograph illustrates how skid racks conserve warehouse space and at the same time make all materials instantly available. The old arrangement shown in the "before" photograph depicts the storage area, waste, and manual handling occasioned by not using tiering facilities. Bulk items of stationery (as well as certain accessory resale merchandise) are stored on pallets in the skid racks and, as required, are moved by fork lift truck to the storage bins for replenishment of bins and for ease in filling orders. Most orders are filled from storage bins as described under Order and Distribution; however, some orders may be filled directly from the pallets that are moved to the shipping area.

The former centralized arrangement in San Francisco necessitated shipments to distant points. Decentralization of large quantities to outlying points facilitates combining stationery shipments with other shipments, thus ensuring savings on parcel post and freight expense. A good example is observed in the case of an accessory shipment to a service station within a metropolitan area. The second package containing stationery can be shipped usually for a fraction of the cost of the first package. It was found that a 50 pound package formerly shipped from San Francisco to a distant service station was costing \$1.75. The new arrangement, by utilizing an Accessory Warehouse within the distant area, permits the same package, when accompanied with a package of accessories, to go forward for 10¢, a saving of \$1.65.

Prior to the installation of skid racks and pallets, vertical storage area was wasted, orderly arrangement was difficult, and an excessive amount of manual handling was entailed. With modern equipment, bins are easily replenished and the filling of orders is expedited.



Figure 3. Post card type of check list order form for certain marketing units.

Amt.	Ship to STANDARD OIL CO. OF CALIFORNIA
pad S-4—Meter Register.....	Station.....
pad S-28—Delivery Receipt.....	
pad S-29—Del. Rec. Acknowledgment.....	
pad S-85—Monthly Report-W.O. Operations.....	
cards *S-93—(LA.SF.RB.Pt.) Flamo Cly. Order.....	
env. S-120—White Env. Carded S. O. Co.....	
env. S-126A—Red. Scrip & Del. Inv. Env.....	
shts. S-194—Redeemed Coupons.....	
pad S-262F—Standard Flamo Comb. Agreem't.....	
shts. S-225—Std. Flamo Endorsement.....	
shts. ★S-800—Sales Progress Report.....	
pad ★S-800A—Delivery Invoice.....	
pad ★S-800A-2—Del. Inv. (Wash. Ore. Ida.).....	
pad ★S-800A-6—Del. Inv. Copy.....	
pad S-800A-7—Del. Inv. File Copy.....	
pad S-800B—Daily Cash Statement.....	
pad S-800C—Draft Purchase.....	
pad S-800D—Receipt.....	
pad S-800-IB—Container Delivery Charge.....	
pad S-800PS—Periodical S. P. Report.....	
pad S-801A—Substa. Weekly Report.....	
pad S-801B—Wk. Order T.C. Shipments.....	
pad S-802—Substation Monthly Inventory.....	
pad S-812—Emerg. T. T. & Office Order.....	
pad S-816—App. of Expend. Rider.....	
pad S-918—Stock Delivery Control.....	
pad GO-9 Short—Requisition.....	
pad GO-9 Long—Requisition.....	
pad GO-23—Working Fund Disbursement.....	
Branch..... District.....	
pad GO-101—Time Book.....	
pad GO-101-2—Overtime Report.....	
pad GO-144—Memorandum.....	
shts. GO-165—Trav. Expense Report.....	
pad GO-208—Products Used.....	
set GO-308—Employment Changes.....	
env. GO-499-2—Enclosure Env.....	
env. GO-500 GEN—Kraft Env. 5x10 $\frac{1}{2}$	
env. GO-501—Kraft Envelope 7 $\frac{1}{2}$ x10 $\frac{1}{2}$	
pad CD-1—New Customer Record.....	
pad CD-33—Collection Report.....	
pad TD237-4—Motor Tr. Receipt.....	
pads 5 $\frac{1}{2}$ x8 $\frac{1}{2}$ Scratch Paper..... pads 4 $\frac{1}{4}$ x6 $\frac{1}{2}$	
bxs. #1 Gem Clips..... bxs. #3 Gem Clips.....	
# 3 Pencils..... #4..... Red..... Blue.....	
Order A-19 Signal Loading Ticket direct from Signal Oil, Los Angeles, on GO-9 per F.A.M.	
OTHER FORMS AND MISC. ITEMS	
Additional Space on Other Side of Card	
<small>Order once quarterly on date allotted you except in Emergency Cases, which must be the exception rather than the rule. Items not filled are out of stock. Place on next regular order. *Be sure these items are correctly marked. *Indicate which suffix is wanted.</small>	

Sometimes the package can be combined with a freight shipment, in which case similar savings also accrue, as advantage can be taken of the minimum 100 pound rate, although there might be a slight increase in over-all charges because of the inclusion of a commodity upon which a higher rate is imposed. At other warehouse points advantage is taken of forwarding stationery by Company-owned equipment. In the aggregate, when multiplied by thousands of shipments monthly, the net freight and parcel post expense savings are large. An important requirement is that service stations be instructed to forward the monthly stationery order along with an order for accessory stock replenishment.

Order and Distribution

In many cases it is not necessary to wrap the stationery in packages, as it can be packed loosely in boxes, thus saving wrapping time and wrapping supplies. For example, service station salesmen and dealers, utilizing the "will call" facilities of metropolitan Accessory Warehouses, can pick up stationery along with tires, batteries, or accessories. No transportation expense or wrapping is required. Open boxes are supplied also at area stationery warehouses for shipment by Company-owned equipment to local points within the respective areas.

Other features of warehousing, that are identified more with ordering procedures, are described as follows:

One of the most interesting features of the new program is the development of a standardized check list order form (Figure 2) for use by all types of Company divisions in replenishing current working supplies from warehouse stocks. Special standardized check list forms were provided previously for certain marketing units (Figures 3 and 4) and have been in effect for some time. The development of a standardized check list order form takes into consideration the following significant points:

1. Eliminates repetitive copying of items by the ordering units which maintain bins for current working supplies. As shown by Figure 2, forms are preprinted on ditto master sets. Individual items and estimated monthly requirements are filled in by each ordering unit prior to reproducing the forms. The "standard package" column is filled in by the control agency in the purchasing organization. Ordinary office equipment can then be employed in reproducing supplies of the form for each ordering unit, each of which have varying requirements of each unit. By means of these pre-determined lists each ordering unit need only insert on the check list, quantities

on hand and the quantities required, and forward the list to the warehouse.

2. Provides a full and proper description of each item and eliminates guesswork as to items and quantities desired.

3. Minimizes the possibility of overstocking and provides a single record for controlling usage.

4. Places items in the order in which stored in bins and thus minimizes time necessary to fill the order.

5. Provides a "standard package" column for the information of the ordering unit. It is desirable, obviously, for the ordering unit to order a package or packages rather than split package quantities. Standard packages of the sizes desired can be developed with printers.

6. Minimizes the necessity for interim ordering as items and usage are indicated and inventory posted thereon.

It is desirable that current working supplies for each ordering unit consist of at least one month's supply and be ordered on a once-a-month basis. If storing facilities are adequate, supplies for a longer period than one month may be ordered, particularly if the items can be sent direct by supplier in large quantities. The ordering dates are pre-determined for each ordering unit so as to spread the work load evenly over the month at the ware-

house. As indicated by Figure 2, the specific ordering period for the unit is shown at the bottom of the form.

A post card type of order form (Figure 3) is used by certain Marketing Organization units. It is compiled quarterly by the ordering unit and has proven adequate to meet the limited requirements of this segment of the business.

A special type of standardized order form (Figure 4) is used by Company-owned service stations. All of the principles described under Figure 2 are applicable to the service station form. The "standard package" column is not shown but is included instead in station procedure manuals. Due chiefly to limitations as to space at service stations and the spoilage that may be encountered due to weather conditions, the storing of large supplies is difficult. It is desirable to order larger quantities of an item if it is not bulk and is used infrequently. It should be mentioned also, that sales promotion material such as road maps are supplied to stations from warehouses.

The check list order form is not designed to include all items that may be stored at the warehouse, but only those items which experience indicates the ordering unit normally requires. Consequently, a Stationery Supplies Catalog is provided which lists all items available in the warehouse. In cases where satisfactory arrangements can be made, the ordering unit can withdraw items from local suppliers who may carry stock under contractual arrangements. Other items, if required for a special purpose and not part of regular stock, may be purchased locally in accordance with purchasing instructions.

Controlling Inventories

Other procedures that have been adopted are as follows:

- Warehouses submit a monthly estimated inventory to be obtained on a spot check basis. This inventory facilitates scheduling replenishment of stocks and determination of quantities used. Later experience may justify placing this inventory on a quarterly basis instead of monthly.

- Stock is tallied directly to the proper copy of the purchase orders which is forwarded to the warehouse by the control agency in the purchasing organization. Purchase orders are retained in an "in transit" file until material is received.

- No back order file is main-

tained for items not in stock at the time the order is received. A rubber stamp is used for imprinting the following on the face of the order: "Items not filled are out of stock. Place on next regular order".

- Manpower is controlled through the use of performance standards.

- No detailed accounting records are maintained on stationery movements in or out. Warehouses maintain minimum and maximum stock inventories by placing notations on the bins on tags. Whenever a minimum is reached on a particular item a shortage notice is prepared and forwarded to the control agency of

the Purchase and Stores Department. The bin is ear-marked to indicate that a shortage notice has been prepared.

To those investigating and interested in improving upon stationery handling and storing methods, the arrangements described herein should prove effective and economical. The principles necessary to an effective program are briefly summarized as follows: (1) centralized planning of requirements, (2) determination of economical order quantities, (3) staggered ordering dates, and (4) full utilization of cubic storage area with proper tiering and mechanical handling.

Figure 4. Check list type of order form for service stations

STANDARD STATIONS, INC. - STATIONERY ORDER					
ATTENTION BEFORE ORDERING, TAKE INVENTORY OF STATIONERY. LIST QUANTITIES IN "ON HAND" COLUMN - THEN ORDER ONE MONTH'S REQUIREMENTS.					
DATE _____					
SERVICE STATION NUMBER AND ADDRESS (STAMP ALL COPIES)					
QUAN. ORD'D.	DESCRIPTION	ON HAND	QUAN. ORD'D.	DESCRIPTION	ON HAND
	pad GO-5A-SS L.A., Pt., S.F. Purch. Order			pads SS-111 Receipt for S.O. Co. Coll.	
#	To #			pads " -111A Transmittal List	
	pad GO-144 Letter Pad			cards " -115 Parking Tag	
	env. GO-500 Gen.			# To #	
env. SS- 4A Env. Add. Accts. Of.				env. " -134 Plain Envelopes	
pad " - 5 Service Invoice				pads " -249 Receipt	
#	To #			pads CD- 48 Appl. for Credit Cc.	
	cards " - 8 Rental Bat. Reminder			pads CD- 49 Appl. Spec. Credit Terms	
	cards " - 9 Lub. Notice Post. Card			pads S - 28 Delivery Receipt	
env. SS- 14 Tacks Collector				288 " "	
pad " - 19 Env. Box				Only Rcpt. Trans. List. Terms	
STATIONERY CATALOGUE FORM					
	sheets " - 66 Customer Log			boxes " - 100	
	sheets " - 66C Open - Close Analysis			Pencils	
	cards SS- 85 Station Lub. Record			pads Scratch Paper	
	cards " - 85A Under the Hood Record			Victor Adding Machine Ribbon	
	pad " - 94 Working Fund Disburse.			R. C. Allen " " "	
	cards " - 105 Tire Record			Maps	
	env. " - 106 Redeemed Scrip Env.				
ITEMS NOT FILLED ARE OUT OF STOCK PLACE ON NEXT REGULAR ORDER					
MAIL ORIGINAL AND TRIPPLICATE COPIES (DO NOT REMOVE CARBON) ALONG WITH SS-48 TO ACCOUNTING OFFICE. STATION WILL RETAIN DUPLICATE COPY.					

ORDER ONLY ONCE EACH MONTH AS INDICATED IN THE MANUAL EXCEPT IN EMERGENCY CASES. THESE EMERGENCIES MUST BE THE EXCEPTION INSTEAD OF THE RULE.					
FORM SS-91. (OMN 6-48)					

Fungus Fighters

Mildew and rot destroy millions of dollars worth of products annually.

Organic paints, adhesives and plastics are attacked under certain conditions.

Protective treatments lengthen useful life of wood, cotton, and leather.

By John L. Kent

Photographs by courtesy of U. S. Army Signal Corps and Engineer Corps; Bureau of Plant Industry, Soils, and Agricultural Engineering, Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture.

In a small sealed room at the Engineer Center at Fort Belvoir, Virginia, man is waging a battle against an insidious microorganism which spoils millions of dollars' worth of man's handiwork every year—fungus.

Since the latter part of 1944, tropical fungi have been running riot in the Engineer Center's tropical test chamber, a specially-built humidity and temperature controlled room. What these fungi are doing to several score items of equipment within the chamber will determine what the Army will buy for its troops in the future.

The lessons being learned here are proving of value to homeowners, buyers of cotton and leather goods, and businessmen whose products are subject to the so-called "rot"—an accelerated deterioration due to fungus growth. "Mildew" is another name for it.

Although mildew and rot fungi are commonly believed to thrive only in the tropics, they flourish everywhere, and especially where humidity is higher than 80% and the temperature above 75 degrees. Even in the relatively dry section of the United States between the Rocky Mountains and the west coast, fungi are active in moist material.

Fungi are simply forms of plant life. They are not self-supporting, but grow mainly on materials produced from green plants that supply them with food. Such materials include organic substances such as wood, cotton, leather, felt, paints, adhesives and some types of plastics.

They are found everywhere. Each gram of surface soil, for example,



Cotton fabric samples are treated with mildew-resistant finishes and inoculated with fungus growth for test.

contains from 10,000 to 200,000 bits of fungus and fungus spores, each capable of growing and reproducing indefinitely under favorable conditions.

Not all fungus growth is harmful. If dead plant parts were not broken down by the fungi they would accumulate and cover the surface of the earth, soil humus would not be formed, and the air might become so poor in carbon dioxide that green plants could not grow.

There is a large number of molds in the penicillium group, different ones of which change sugar into citric acid, fats and other chemicals, help make Roquefort and Camembert cheese, and make the recently-discovered drug penicillin. Unfortunately, *penicillia* also cause fruit decay and attack leather, cloth and some glues.

One of the most common fungi is the ordinary mold of bread. Fungi which attack foods are especially

destructive and cause substantial losses in the world's total food supply. These losses take place chiefly in humid regions. Heaviest losses are in wheat and corn. The spoilage problem has not been solved because almost all fungus inhibitors are poisons and can't be used on grains or other foods.

Other fungi grow on vegetation—leaves, tree trunks, underbrush. The spores are carried through the air, and no object that is not tightly sealed can long remain uncontaminated.

begun during the war in testing resistance of materials to fungi-accelerated deterioration. The tropical test chamber is only one of several testing and experiment projects concerned with fungus growth.

The chamber is a rectangular box, 14 x 32 feet and 12 feet high. It is built of brick, with a layer of asphalt-impregnated mineral wool about 4½ inches thick and faced inside with cement-asbestos board.

Large double doors which open 9 feet wide and 11 feet high enable the chamber to accommodate equipment

temperature is allowed to fall to 75° F and the humidity raised to 95%. The change in temperature produces dew as in nature. This condensation provides a film of water ideal for fungus growth and excellent for the corrosion of metals.

The chamber was "inoculated" by spraying it with spore suspensions of 24 species of fungi obtained principally from Pacific areas. Additional fungi were brought in with the leaf mold placed on the floor of the chamber. The test specimen repose on wooden shelves within the chamber.

Exposure in the tropical test chamber submits the samples to conditions approximating those found in nature, and constantly reinoculates samples with fungus spores. Because there are several types of fungi in the chamber, it tests fungicide-treated articles against all of them.

Broad Applications

Among the articles now in the chamber are several samples of artificial legs. These are made of various materials, including plastics and impregnated fabrics, some with aluminum knee and ankle joints.

In the course of American wartime research for the prevention of deterioration of optical instruments, textiles, plastics and photographic equipment, some 4,500 fungus cultures and 1,100 bacteria cultures were collected by a research group under the Office of Scientific Research and Development.

Supplementing these cultures, collected from tropical countries and islands, were elaborate laboratory and field studies, particularly in the jungles surrounding the Panama Canal. Here at Barro Colorado



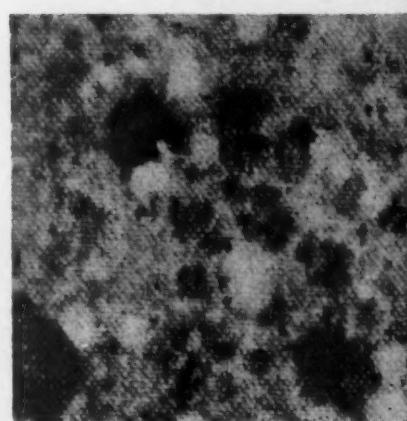
Fungus action takes a large annual toll in wooden buildings where damp conditions prevail.

Because fungus cannot grow without moisture, the Army and Navy in World War II, began fungus-proofing equipment by spraying it with wax and plastic coatings to keep out water. New chemical finishes were developed for tents and tarpaulins. But often fungus-resistant materials such as plastics, nylon, and metal were substituted for leather, cotton, and wood parts.

The Engineer Center's tropical test chamber is continuing the work

ment of truck size. As you enter through a small door on the side you note the heating and cooling coils on one side of the chamber. In a few minutes you get uncomfortably warm. No, it isn't the heat—it's the humidity.

Temperature in the chamber is adjusted to run in cycles, reproducing conditions which are found in the tropics. During the daytime, the temperature is kept at 85° F and the humidity at 90%. At night the



Cotton duck shows numerous fungus spots after one year weather exposure at the Southern Regional Laboratory, New Orleans.



Electrical equipment was protected from fungus growth during World War II by spraying with plastic compounds.

Island in Gatun Lake a battery of test for new fungicide treatments was set up. Some treated specimens were exposed to direct sun and rain. Others were shaded by open roofed structures.

For a more rugged test, materials were left lying directly on the jungle floor amid decaying leaf mold, dead twigs and branches and other breeding grounds of jungle fungi. Altogether some 15,000 items were put through these tests. A collection of microorganisms found on the spoiled samples was sent to the tropical fungus collection maintained at Harvard University.

Sharing the Answers

To make results of tests at Panama and other information on fungus available to those who could benefit from it, the National Research Council has set up a Tropical Deterioration Center in its Washington headquarters.

A "tropical room" similar to the Fort Belvoir test chamber was in operation for over two years during the war at the University of Pennsylvania.

Many answers were found both in Panama and in the laboratories at home. For example, an adequate method for controlling fungus growth within optical instruments was developed. It consists of applying a mixture of 50 percent of the fungicide *Cresatin* (metacresyl acetate) and 50 percent ethyl cellulose enclosed in a small aluminum capsule with minute openings. The capsule is cemented within the instrument out of the path of the light rays. Under drastic conditions in the Panama jungle the capsule

prevented deterioration of binoculars for 21 months.

Practically no information on the tropical deterioration of plastics existed prior to the war. The research established the fact that fungi surface growths on plastics used in electrical equipment affect the electrical properties of the plastic.

A fungicidal treatment for film negatives was developed which shows excellent promise. A lacquer containing the mercurial fungicide *Merthiolate* was found effective in controlling deterioration of camera parts.

There are now many treatments and preservatives. But some are dangerous to persons and give unpleasant odors to goods. The preservatives used on fabrics are usually of four types: (1) metallic napthenates, (2) phenolic compounds, (3) pure organics, and (4) mercury compounds.

Wood Preservation

The wood preservation problem is nearing solution. There are available in addition to those mentioned for fabrics, creosote, fluorides, arsenicals, and plain or chromated or ammoniated salts of zinc and copper. Pentachlorophenol has recently become prominent. Most of these can be applied to all kinds of lumber—preferably by pressure treatment but also with fair effectiveness by open-tank immersion.

At the Plant Industry Station at Beltsville, Maryland, the Department of Agriculture makes tests to determine the type of fungus causing plant disease. Several of Agriculture's divisions now have more than 442,000 specimen of fungi, in-

cluding more than 25,000 species at the Station.

In the same building with the other plant fungi is a collection of cultures of fungi that cause decay of living forest trees and structural timber. This collection, one of the largest of its kind in the world, serves as a basis for durability studies on woods used in airplane, boat and building construction.

Engineers and mycologists test the durability of wood by inoculating small blocks of it with specific fungi and then observing the effects. Stakes are also planted in the soil outdoors. Of particular interest to industry and homeowners is a study under way to determine the amount of ventilation or soil cover needed to prevent decay of sills and floors of structures built close to the ground and without basement. Wood decay and its prevention is also intensively studied at the Forest Products Laboratory at Madison, Wisconsin.

Protecting Textile Products

The greatest need for suitable preservatives or treatments is in the textile field. At the Beltsville textile laboratories of the Bureau of Human Nutrition and Home Economics and also at the Bureau of Plant Industry, research is under way to develop a simple, effective treatment to protect fabrics from mildew. More than 250 chemical compounds have been tested. The treated and untreated samples of fabrics are first subjected to conditions favorable to a speedy growth of mildew and inoculated with fungi. Then the breaking strength of each sample is measured.

A number of effective mildew-preventive treatments and finishes have already been found practical for use on shower curtains, draperies, tents and awnings. Some of these can be applied in the home. But none of the treatments can be recommended for use on clothing, because the mycologists haven't found whether the treated fabrics would be irritating to the skin if worn for a long time.

The Southern Regional Research Laboratory of the Department of Agriculture reports that the best means yet discovered for protecting cotton fabrics and yarn from mildew is to convert part of the fiber chemically to a partial cellulose acetate.

Tests have shown that no other rot-proofing treatment gives as much resistance against the various rotting organisms. The treatment causes no discoloration, imparts no odor and does not make cotton

(Please turn to page 322)

Where We Stand

PRODUCTION



Industrial Production Index

Steel Production (Weekly)

Electric Power Production (Weekly)

Bituminous Coal Production (Weekly)

Auto, Truck & Bus Output (Weekly)

Petroleum Output (Weekly)

Engineering Construction (Weekly)

PRICES



All Commodities (BLS)

Farm Products

Metals & Metal Products

Building Materials

Steel Billets (Pitts.)

Steel Scrap, heavy melting, Pitts.

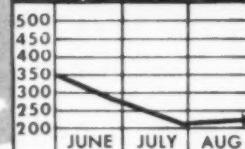
Copper, electrolytic

Cotton, mid., 15/16"

Rubber (rib-smoked sheets)

Wheat, No. 2

TRADE (Dept. Store Sales)



Dept. Store Sales Index (Fed. Res.)

Commercial Failures (Dun & Bradstreet)

Freight Carloadings

FINANCE

Stock Prices (Standard & Poor's)

Bank Clearings (New York)

Federal Reserve Credit

Currency in Circulation

Today's Business Trends As Reported In Current Statistics

	BASE	LATEST	MONTH AGO	YEAR AGO	% OF CHANGE IN MONTH	% OF CHANGE IN YEAR
Industrial Production Index	1935-39=100	165	170	191	- 2.9	-13.6
Steel Production (Weekly)	000 net tons	1,539	1,434	1,712	+ 7.3	-10.1
Electric Power Production (Weekly)	mil KWH	5,466	4,982	5,319	+ 9.7	+ 2.7
Bituminous Coal Production (Weekly)	000 net tons	7,550	4,880	12,150	+54.7	-37.8
Auto, Truck & Bus Output (Weekly)	units	144,373	116,878	108,948	+23.5	+32.5
Petroleum Output (Weekly)	000 bbls	4,670	4,668	5,505	-	-15.1
Engineering Construction (Weekly)	000 \$	196,782	181,236	151,361	+ 8.5	+30.0

All Commodities (BLS)	1926=100	152.7	154.2	169.6	- 1.0	-10.0
Farm Products	1926=100	163.8	168.5	191.1	- 2.8	-14.3
Metals & Metal Products	1926=100	167.9	167.6	170.2	+ 0.2	- 1.4
Building Materials	1926=100	189.9	190.1	202.8	- 0.1	- 6.4
Steel Billets (Pitts.)	gross ton	\$58.24	\$58.24	\$58.24	-	-
Steel Scrap, heavy melting, Pitts.	ton	21.00	20.75	42.75	+ 1.2	+50.8
Copper, electrolytic	lb.	.17 5/8	.17 5/8	.23 1/2	-	-25.1
Cotton, mid., 15/16"	lb.	.3235	.3325	.3213	- 2.7	+ 0.7
Rubber (rib-smoked sheets)	lb.	.16 1/2	.16 3/4	.22 3/4	+ 0.3	-26.1
Wheat, No. 2	bu.	2.33 1/8	2.32 3/8	2.46 1/4	+ 0.3	- 5.3

Dept. Store Sales Index (Fed. Res.)	1935-39=100	228	201	261	+13.4	-12.6
Commercial Failures (Dun & Bradstreet)	no.	176	153	168	+15.0	+ 4.7
Freight Carloadings	cars	716,824	595,321	878,901	+20.4	-18.4

Stock Prices (Standard & Poor's)	1926=100	122.2	117.4	124.8	+ 4.0	- 2.0
Bank Clearings (New York)	mil \$	6,226	6,784	6,504	- 8.1	- 4.2
Federal Reserve Credit	mil \$	18,924	19,279	22,064	- 1.8	-14.2
Currency in Circulation	mil \$	27,409	27,480	27,966	- 0.2	- 1.9

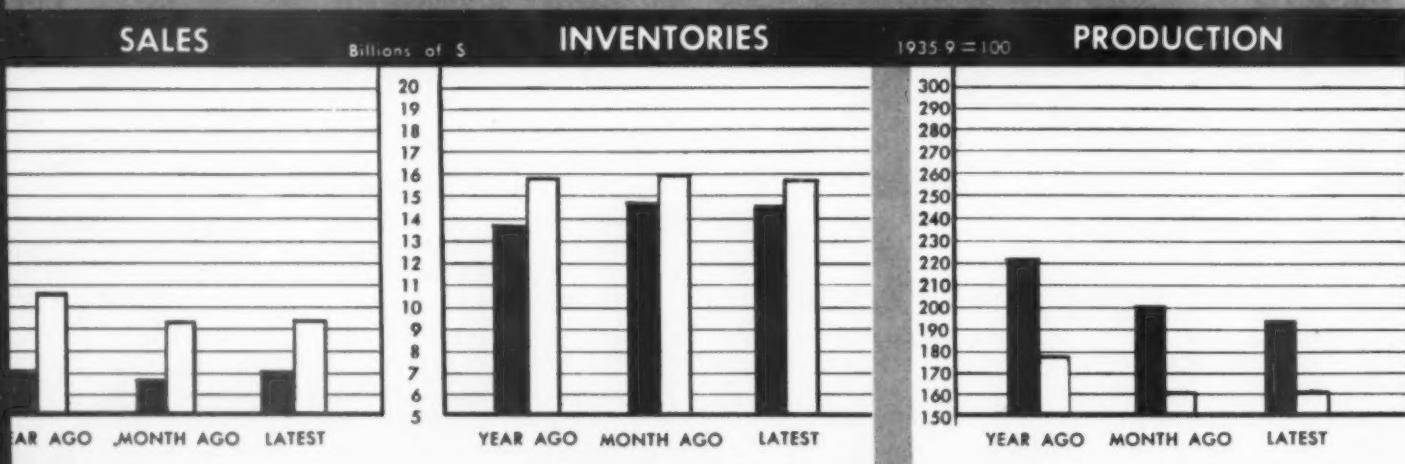
MANUFACTURERS' SALES, INVENTORIES AND NEW ORDERS

	1948						1949					
	June	Jan.	Feb.	March	April	May	June	June	Jan.	Feb.	March	April
Indexes of Value of Manufacturers' Sales (Average Month 1939 = 100)												
Total Manufacturing.....	336	330	335	326	315	317	310*	364*				
Durable Goods.....	369	372	387	381	368	365						
Iron, steel & prod.....	341	380	376	371	336	328						
Nonferrous metals & prod.....	422	419	426	361	352	328						
Electrical machinery & equip.....	452	448	483	487	459	460						
Machinery, except electrical.....	381	333	349	350	331	334						
Automobiles & equipment.....	433	487	519	501	534	538						
Transportation equip., except autos.....	540	544	649	690	633	572						
Furniture and finished lumber prods.....	264	234	237	234	228	231						
Stone, clay and glass products.....	273	233	238	255	258	283						
Other durable goods.....	262	230	229	228	223	225						
Nondurable goods.....	317	306	304	294	284	289		279*				
Food and kindred products.....	326	313	304	289	278	292						
Textile-mill products (excl. apparel).....	340	294	310	280	252	249						
Leather and products.....	245	324	335	313	280	262						
Paper and allied products.....	330	306	313	312	295	299						
Chemicals and allied products.....	320	308	295	381	269	279						
Petroleum and coal products.....	329	346	317	306	288	293						
Rubber products.....	342	N.A.	N.A.	N.A.	N.A.	N.A.						
Other nondurable goods.....	316	281	318	338	326	290						
Indexes of Book Value of Manufacturers' Inventories (Average Month 1939 = 100)												
Total Manufacturing.....	277	298	298	295	292	287	283*					
Durable Goods.....	288	313	317	316	314	307	301*					
Iron, steel & prod.....	218	243	246	242	244	242						
Nonferrous metals & prod.....	263	303	301	312	316	306						
Electrical machinery and equipment.....	397	417	424	425	417	403						
Machinery, except electrical.....	299	317	319	321	319	310						
Automobiles and equipment.....	476	536	549	548	529	515						
Transportation equip., except autos.....	625	674	674	653	673	665						
Furniture and fin. lumber products.....	260	266	271	274	268	259						
Stone, clay and glass products.....	159	189	194	189	185	180						
Other durable goods.....	189	191	197	197	197	194						
Nondurable goods.....	268	286	283	278	274	270		267*				
Food and kindred products.....	227	253	237	220	205	195						
Textile-mill products (excl. apparel).....	256	258	266	264	257	254						
Leather and products.....	262	268	268	264	260	277						
Paper and allied products.....	292	313	308	312	301	300						
Chemicals and allied products.....	284	294	292	288	286	277						
Petroleum and coal products.....	200	228	237	234	240	244						
Rubber products.....	295	N.A.	N.A.	N.A.	N.A.	N.A.						
Other nondurable goods.....	375	405	394	384	372	376						
Indexes of Value of New Orders (Average Month 1939 = 100)												
All Industries.....	265	237	220	218	196	202	N.A.					
Durable goods.....	307	285	253	245	209	206	N.A.					
Nondurable goods.....	240	209	201	202	187	200	N.A.					

Source — Department of Commerce, Revised Series

N. A. — NOT AVAILABLE
*ESTIMATED

SALES, INVENTORIES AND INDUSTRIAL PRODUCTION



DURABLE GOODS

NON-DURABLE GOODS

Straws in the Trade Wind

● Business loans for the week ended August 10 advanced to \$12,906,000,000, a gain of \$80,000,000 over the previous week, according to the Federal Reserve Board. This is the second time that business loan volume has increased in the past 30 weeks. The August 10 figure was \$1,907,000,000 below that of a similar period last year.

● The new increases in railroad freight rates authorized by the Interstate Commerce Commission were scheduled to go into effect on September 1. Under the I.C.C. decision the roads get a boost of 3.7% in rates, in addition to the 5.2% general average increase granted earlier in the year. The latest move is expected to give the railroads an additional \$293,000,000 in revenue.

● Steel production during July fell to the lowest level since December 1946 according to the American Iron and Steel Institute. The output during the month of 5,780,777 net tons was 11% below the production total for June, 18% below production for July 1948, and 28% below the monthly average production in the first quarter of 1949.



● The Government was urged by Edwin C. Barringer, executive vice-president of the Institute of Scrap Iron & Steel, Inc., to "call a halt on the unnecessary depletion of reserves of iron ore at a time when iron and steel scrap is going begging and much scrap that is not being collected will be irreparably lost." The export-import committee of the Institute also asked the Department of Commerce to remove export quota restrictions on iron and steel scrap as a means of arresting unemployment in the industry and preventing breakdown of its collection machinery.

● Timken Roller Bearing Company has announced that test runs to produce steel from Argentine pig iron have proved satisfactory. Argentina has large fields of iron ore, but has not developed a native steel industry.

● The War Assets Administration has sold three government-owned aluminum plants to Permanente Metals Corp. for \$36,000,000. One plant is in Baton Rouge, La., and two are in Spokane, Wash. They have been operated by Permanente under lease since early 1946, with option to buy.

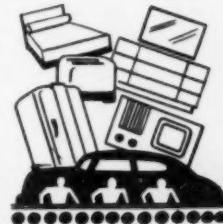
● The Atomic Energy Commission has named a three-man temporary advisory committee to recommend ways

for cooperation with the electric power industry in the reactor development program. The committee will review the program under which atomic energy would be converted to commercial industrial uses. Its recommendations will be made by March 31, 1950.

● In an effort to soften the effects of recession, particularly unemployment, in industrial areas throughout the country, Dr. John R. Steelman, assistant to the president has requested government agencies to transfer their current buying activities to those areas where feasible. The first group of areas includes those communities in which 12% or more of the labor force has been thrown out of work. It was made clear that switching purchases to a new location is not recommended when such a move would create hardships in the communities where the spending was first planned.

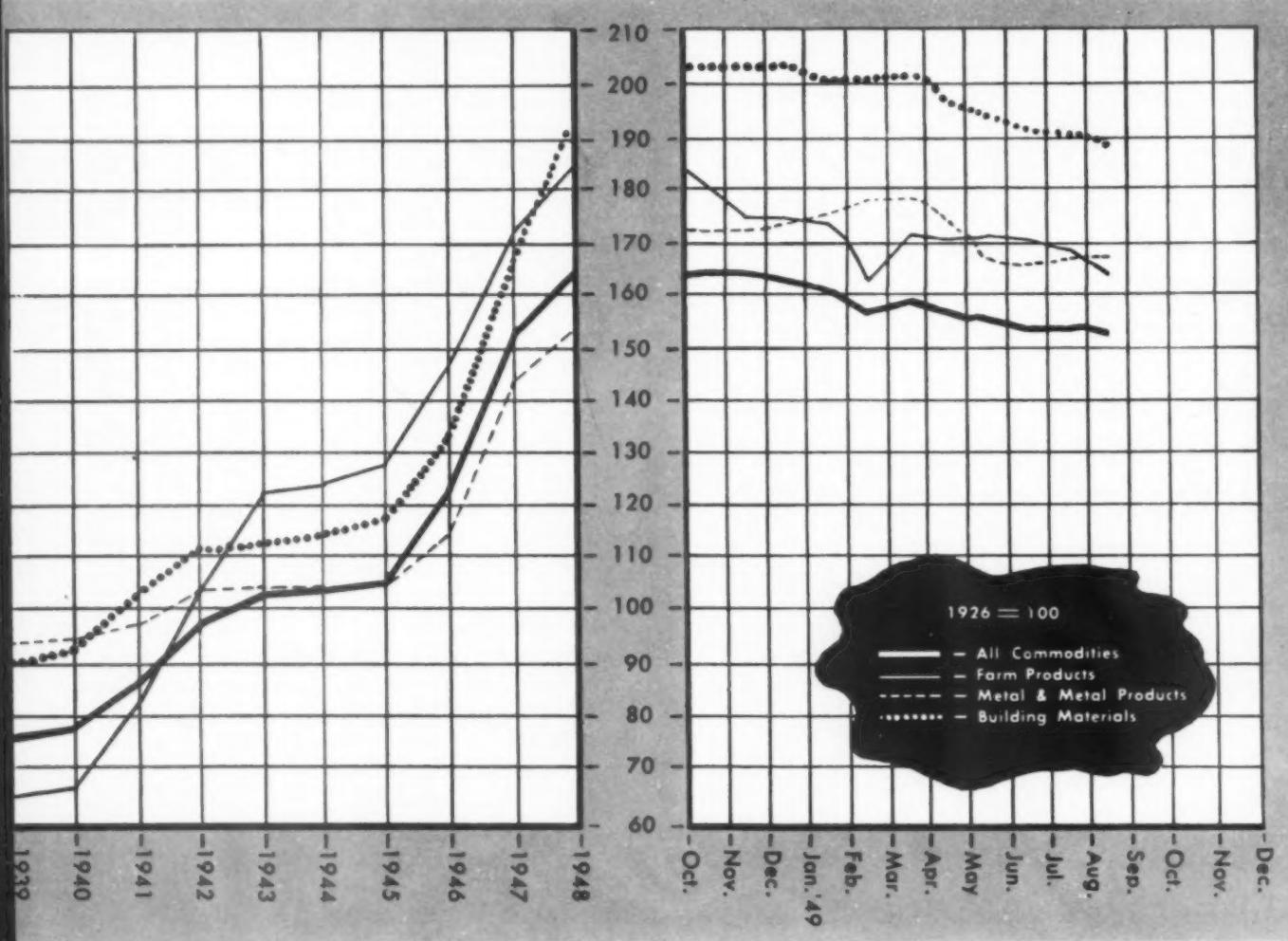
● United States exports in June increased and imports decreased, widening the "trade gap" believed to be one of the principal causes of the dollar shortage throughout the world. Exports rose by \$25,600,000 to \$1,104,000,000. Imports declined by \$14,400,000 to \$526,100,000.

● Business inventories declined by about \$1,000,000,000 during June to reach an estimated book value of \$51,579,000,000 at the end of the month, according to the Office of Business Economics, Department of Commerce. Nearly half of the decline was due to seasonal influences. The report said that the total decline in business inventories from the postwar peak of \$54,400,000,000 in November 1948 to the middle of this year has amounted to \$2,100,000,000, on a seasonally adjusted basis. Part of this decline reflects replacement of stocks at lower prices, according to O.B.E., but after allowing for this factor, "it is clear that a significant liquidation of stocks has taken place." This has occurred in manufacturing and retail and to a lesser extent in wholesale.



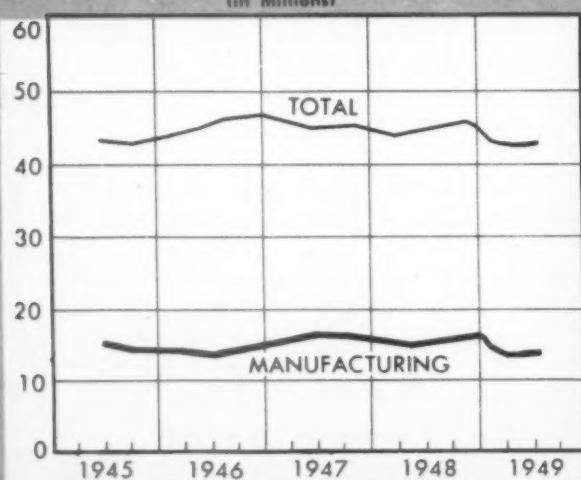
● The Department of Commerce announced that the country's total output of goods and services (Gross National Product) declined to an annual rate of \$256,100,000,000 in the second quarter of this year. This decrease of 2.4% is in contrast to the nearly 2.9% drop experienced in the first quarter. The current rate is \$14,200,000,000 below the record annual rate established in the fourth quarter of 1948.

The Price Picture



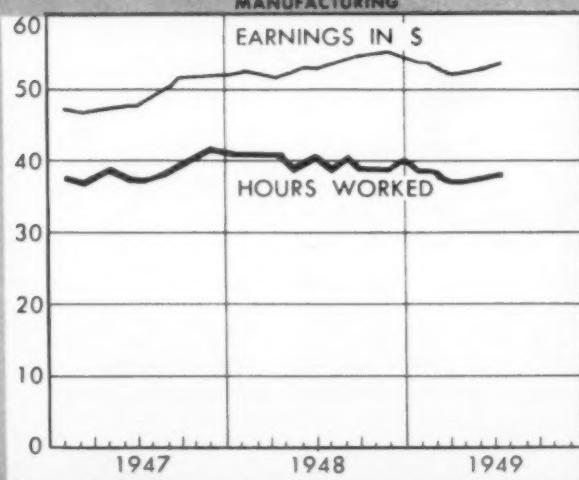
Employment & Earnings

NON-AGRICULTURAL EMPLOYMENT
(in millions)



SOURCE: U.S. DEPT. OF LABOR

AVERAGE WEEKLY EARNINGS AND HOURS
MANUFACTURING



"QUOTES"

"When the historian of the year 2,000 looks back over the 20th century he may well find it possible to say that the soil and plant forest scientists, the fuel and power and mineral experts, and the resource economists, made up a team that helped save the world's resource base when it was in great danger."

— Julius A. Krug
Secty. of the Interior

"We have not had great socialization of property, but we're on the last mile to collectivism through Government collection and spending of the savings of the people. Think it over."

— Herbert Hoover

"Certainly, there are those who misuse the profit system. We cannot have the freedom to speak without someone speaking unwisely and unjustly. Neither can we have the freedom to make profit without some misusing that freedom by taking advantage of others. But, there must be more good practice than bad or this country would not be what it is."

— Lawrence A. Appley
President, American Management Association

"Today, no industry, large or small, can be poor if it cultivates a harvest of creative ideas and has the gumption to develop them. A barn-gang has just as much opportunity today as it had 40 years ago — in fact, I believe, it has more."

— Charles F. Kettering

"The seven continuous months of Congress' first session, in which we have considered hundreds upon hundreds of bills has made the Congress almost punch-drunk. It is slap-happy with legislation, passing huge billion-dollar bills as if in a daze, without realizing the implications."

— Senator Alexander Wiley, (R., Wis.)

"Delay for excise tax reduction would be disastrous to many important industries. After all, Congress was able to declare war on Japan in 24 hours. It need not take them more than a week to declare war on unemployment." — Beardsley Ruml
R. H. Macy & Co.

"(The Government's) stumbling advances into socialism are, step by step, being sanctified by Congress and courts as within the constitutional objectives of the national Government."

— Donald R. Richberg
Former head of NRA

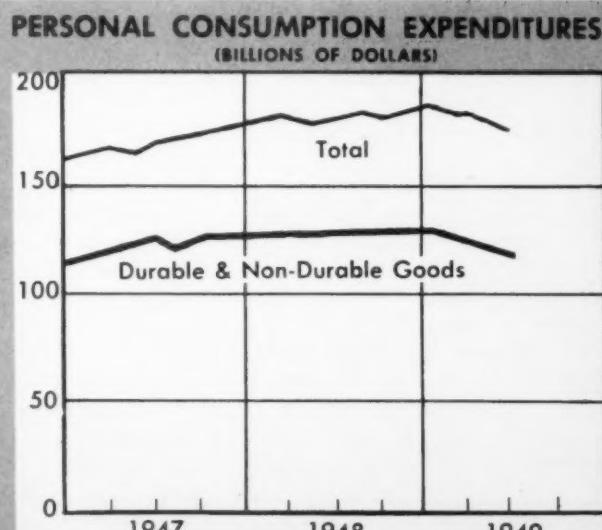
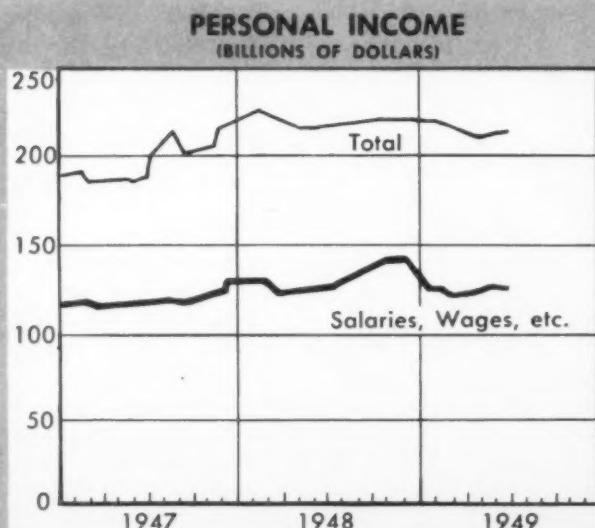
"We are still living beyond our means. The vast and menacing increases in state expenditures constitutes the basic inflationary influence in our whole economy."

— Report of the Federation of British Industries

"A sound system of protection, should have as its foundation an adequate system of governmental contributory social insurances, developed by common consent of all citizens, supplemented wherever possible by private contributory programs of benefits, likewise developed by common consent."

— J. Douglas Brown
Dean of the Faculty
Princeton University

Personal Income & Expenditures



Materials & Markets

STEEL



The big question in the steel situation, of course, is the possible strike, an event that might be taking place as this is read. Both participants in the dispute appeared to be more adamant than ever at this writing, days before the mediation board even handed down its recommendations.

With the approach of the end of the 60-day truce, meanwhile, steel production somewhat unexpectedly stopped short in its gradual descent and put in several weeks of increase. The operating rate of the industry for the week beginning August 15 was scheduled to be 83.5% of capacity, equivalent to 1,539,000 tons of steel ingots and castings for the entire industry. This is in comparison to the 1,517,200 tons scheduled for the previous week, 1,712,400 tons one year ago, and 1,281,210 tons for the average week in 1940, the highest prewar year.

Opinion was divided as to what was behind the change in strength, indicating that it was probably due to a combination of factors. Fears of shortages because of a strike undoubtedly contributed to the increase of new orders. Also important in steel, as in most other lines, was the replenishing of inventories after substantial reductions during the past several months. Evidence of an upsurge in the home appliance field was revealed in the greater demand from that quarter for steel sheets and bars. And the automobile industry continued to buy heavily for its needs. Generally, it is believed that fears of a strike helped, but were not a major factor, in the upsurge, and that a good demand will exist at least into October, providing there is no strike.

Greater demand, higher freight rates, unchanged or higher raw material costs, and no prospect of lower labor costs are working together to make a pretty effective barrier against any price reductions in the near future, according to opinion in the industry.

FUELS

In anticipation of the increased demand resulting from colder weather — and perhaps a more severe winter than the unexpectedly mild one of 1948-49 — fuel oil prices (both for home and industrial use) began edging up. Diesel oil prices also were raised .3 to .7 a gallon in New York. Indicative of increasing demand was the crude oil allowable increase granted to Texas producers in August by the Texas Railroad Commission. September production was set at 2,077,905 barrels daily, an increase of 132,268 barrels over the August allowable. The Commission's action in raising or reduc-

ing the allowables is based on purchasers' requests for the month.

As demand began to increase, coal production continued to be affected by the 3-day work week instituted by John L. Lewis. As this was written, there was little indication that the 3-day week would end soon, particularly in view of the uncertainty over the steel strike. Lewis is admittedly out to keep production down and reduce stockpiles, something that could not be achieved if any appreciable number of steel mills were forced to close. The increased demand for coal, the added costs of the operators under the 3-day work plan, and the higher freight rates recently obtained by the railroads all point to a rise in coal prices, unless Lewis decides that it would be expedient to return to the 5-day week.

The state mines department of Pennsylvania has reported that hard-coal tonnage was off 28% up to August 1, and bituminous production 17%, compared with a similar period in 1948.

NON-FERROUS METALS

Demand for lead continues strong following an advance of $\frac{3}{4}$ ¢ to $15\frac{1}{2}$ ¢ earlier in the month by a custom smelter. The price advance became general during the month when the St. Joseph Lead Co. came up to that level from the 15¢ a pound previously quoted. Chief factors in the demand for lead, which are expected to continue strong, are Government stockpile purchases and consumption by the automobile storage battery industry. With shortages over and prices stabilized, the battery industry expects to return to the prewar seasonal pattern when over 70% of its replacement sales were concentrated in the last six months of the year, in contrast to the maximum monthly variation of 3½% in postwar sales.

Despite the surprise occasioned by figures showing that copper deliveries in July were less than those in June, the market is still strong and it is expected that deliveries will increase considerably in August. Demand is good at $17\frac{1}{2}$ ¢ a pound, and is variously interpreted

as a result of consumers rebuilding depleted inventories, and preparing for future activity. This uncertainty appears to add fuel to the debate between those favoring reimposition of the copper import duty and those opposing it. Some trade circles say the disappointing delivery figures for July are due to imports, and a continued rise in stocks can be expected if the duty on foreign copper is not replaced. C. Donald Dallas, chairman of Revere Copper & Brass, Inc., on the other hand, says that



domestic consumption of copper will soon be running 30,000 to 40,000 tons a month above domestic production and imports will be needed to make up the deficit.

Demand for zinc is reported steady at 10¢ a pound, reflecting the increased use for galvanizing as the steel rate increased. This is another related field that will be affected if the steelworkers decide to strike...Aluminum alloy casting ingots in some grades rose as much as ½¢ to 1¢ a pound in the face of increased demand. This was a reversal of the downward trend that prevailed up to June.

FOREST PRODUCTS



Paper and paperboard production appeared to be coming out of its July slump as seasonal factors began to assert themselves. The output of paper for the week ended August 13 was at 85% of estimated capacity, according to the American Paper & Pulp Association, as compared with 83.3 in the preceding week. Production in a similar period in 1948 was 96.1%. Paperboard production was at the ratio of 84% for the same week, as against 82% for the previous week, and 93% a year ago. Production of paper and board for the first half of 1949 was 9,700,000 tons, in comparison to last year's production for the same months of 11,138,000 tons.

The anticipated stiffening in lumber and plywood prices, following a long period of decline, has become evident. Demand has picked up considerably in line with general business conditions, and some further price rises are expected during the fall months if business activity maintains its current slight upward trend. Some large producers have increased their plywood prices recently on an average of 3% to 4%. Both softwood and hardwood prices, while not showing any widespread rises, have remained firm as demand increased. To the middle of August, shipments for the year of 420 mills reporting to the National Lumber Trade Barometer were 2.3% above production; orders were 3.1% above production.

CHEMICALS

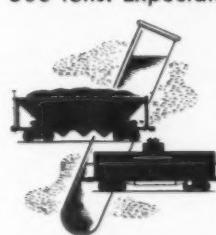
The overall price picture in the chemical market, as in other major markets, continued firm in line with general conditions. The outlook in the trade is cautiously optimistic, at least for the next few months, with demand improving considerably over the slack summer months. An indirect, but important, factor arousing some pessimism is the possibility of a steel strike in September, which would have decided effects on coal-

tar and fertilizer chemicals, and secondary effects on many organic chemicals.

Increased buying of caustic soda and soda ash are expected to continue for the next couple of months, keeping prices firm. Supply of both is good.

MISCELLANEOUS

Despite a mid-month drop of about 3¢ per carlot drums in the price of linseed oil, some trade circles were anticipating higher prices this fall because of increased demand and the support given by the Government loan. The demand for paint is reported to have picked up, resulting in a greater call for linseed oil...The Department of Agriculture has predicted another record or near-record supply of fats and oils for the 1949-50 marketing year, with exports remaining large and the supply for domestic consumption holding at about last year's level. Prices of fats and oils, it was said, will probably continue low "unless consumer income and industrial activity reverse their present downward trend"...The Department of Commerce has reported that total consumption of natural rubber in the first half of 1949 exceeded production by 32,500 tons. Consumption was estimated at 732,500 tons. Expectations of the Soviet Union purchasing

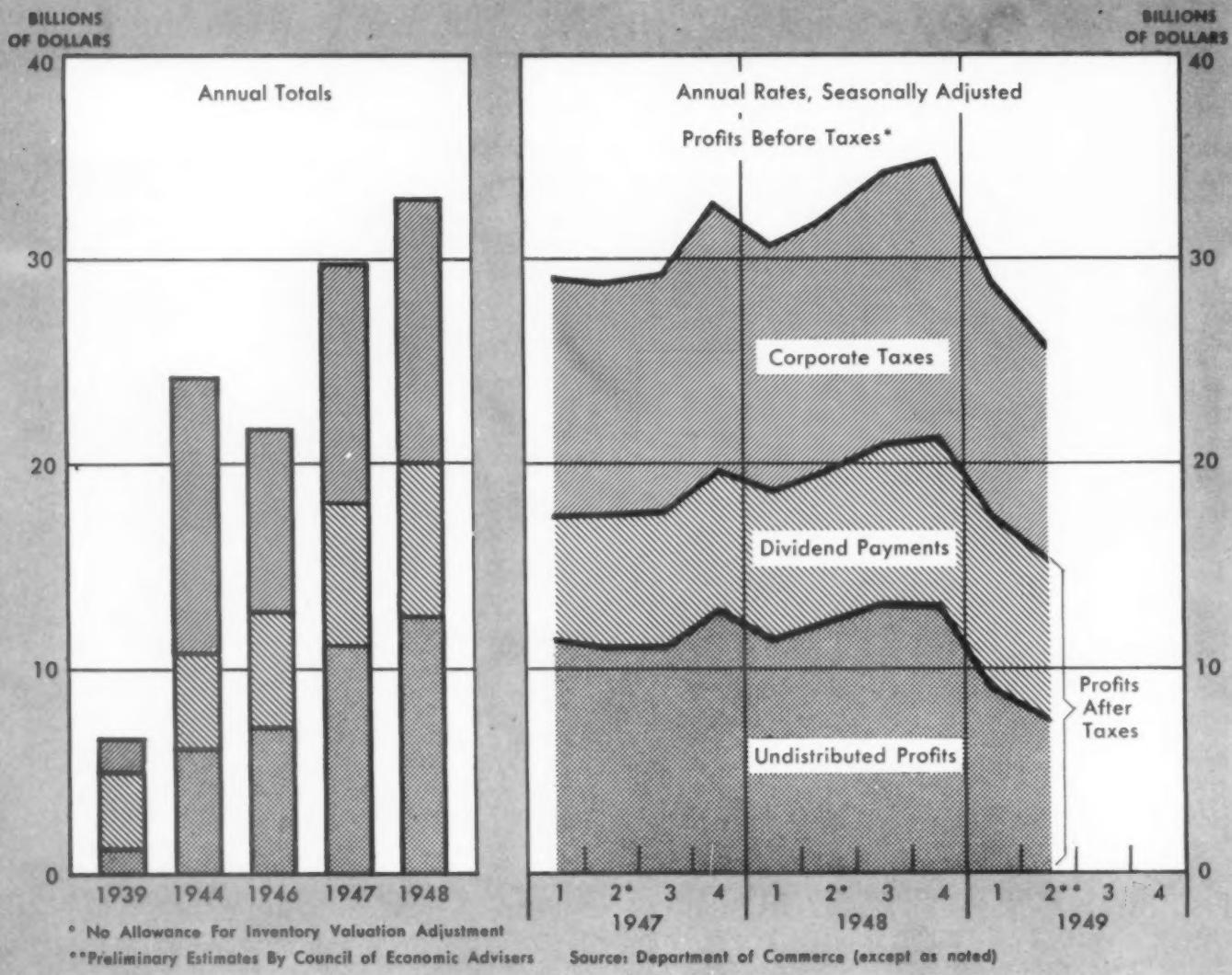


16,000 tons of rubber during August (which would be the highest monthly total of Russian buying during the past 9 months) was reported to have steadied the Singapore rubber commodity market...Consumption of burlap in this country continues to decline. Industry figures show that during July, only 41,000,000 yards were used, the lowest point in several years. Little relief is seen in prices, however, until Indian producers change their current policy of deliberately reducing production.

PRICE DEVELOPMENTS

General Electric Company, Pittsfield, Mass., has reduced prices on G-E glyptal alkyd resins about 1 ½¢ a pound, or up to 9%. The new prices are based on anticipated lower raw material costs...The Glidden Company, Cleveland, O., has reduced the wholesale prices of its top quality paints, varnishes and enamels an average of 8 ½%...Wyandotte Chemicals Corporation, Wyandotte, Mich., has cut prices on its technical grade of benzenesulphonyl chloride. The reductions range from 20% to 25%...Colorado Fuel & Iron Corporation, Denver, Colo., reduced the price of rails by \$2 a ton. The new price is \$3.20 per 100 lbs., f.o.b. mill, which is in line with other sellers on an f.o.b. mill basis.

CORPORATE PROFITS



(Billions of dollars)

	Corporate profits before taxes	Corporate tax liability	Total	Corporate profits after taxes	
				Dividend payments	Undistributed profits
1929.....	9.8	1.4	8.4	5.8	2.6
1939.....	6.5	1.5	5.0	3.8	1.2
1944.....	24.3	13.5	10.8	4.7	6.1
1946.....	21.8	9.0	12.8	5.6	7.2
1947.....	29.8	11.7	18.1	6.9	11.2
1948.....	32.8	12.8	20.1	7.8	12.3
Annual rates, seasonally adjusted					
1948: First quarter.....	30.5	11.8	18.7	7.4	11.3
Second quarter.....	32.1	12.5	19.6	7.4	12.2
Third quarter.....	34.0	13.3	20.8	7.7	13.1
Fourth quarter.....	34.7	13.5	21.2	8.3	12.9
1949: First quarter ¹	28.8	11.6	17.2	8.3	8.9
Second quarter ¹	25.5	10.2	15.3	8.0	7.3

¹ Estimates by Council of Economic Advisers; based on preliminary data.

NOTE: No allowance has been made for inventory valuation adjustment.

Detail will not necessarily add to totals because of rounding.

Source: Department of Commerce (except as noted).

The Care and Cleaning of Washroom Fixtures

• By Richard Irmter
Crane Company, Chicago



Drinking fountains get more use in hot weather than any other type of plumbing fixture. It is important that they are kept in top operating condition. (Right) Washrooms used daily by a large number of persons are not as likely to be abused if kept as spotless as this one.

PLUMBING fixtures are tough. They will stand up under a lot of hard usage and still remain smooth and beautiful for a lifetime. But we must remember there is a limit to the abuse they will take. Toilets and lavatories weren't made to stand on, to use as anvils, to act as garbage cans, work benches or tables. They should be treated kindly and should be kept in repair and cleaned often, for cleanliness is the most effective check to ill treatment of fixtures.

Some Common Abuses

There are definite procedures that should be followed in cleaning and maintenance of industrial washrooms. It should be remembered that maintenance is a constant problem in such installations. Industrial plumbing fixtures are subjected to a hundred times the usage and abuse that home plumbing fixtures have to undergo. A faucet on a home lavatory may be turned on and off only a dozen times a day. In a busy plant washroom a faucet may be turned on and off at intervals of a few minutes all day long—and all night long too, if the plant operates on extra shifts. And many people seem to delight in ill treatment of semi-public or public plumbing.

Abuses that are taboo in the home appear to be accepted sport in the plant washroom by some. They leave the water running; they wrench the faucet handles so tightly that the stems are twisted and seat washers are cut through in just a few shut-offs; they throw cigats, cigarettes and waste paper in the wash basins and urinals; they plug up toilet bowls with orange rinds and with lunch bags full of garbage; they sit on the edges of wash basins until the basins tear loose from the walls; and they put their feet on toilet seats or the edges of lavatories in order to wipe off their shoes.

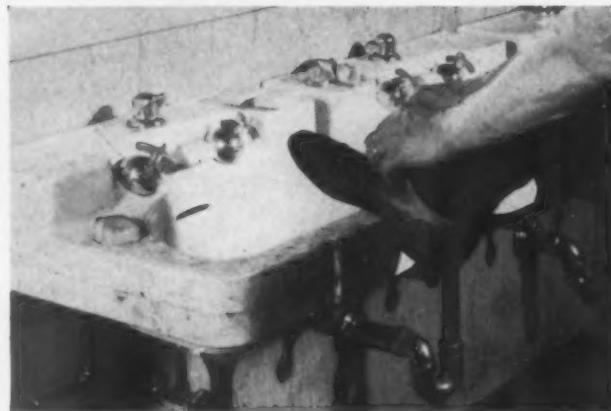
Such inadvertent vandalism is almost impossible to control. Policing the washrooms creates ill will and

can lead to more and deliberate vandalism. Much of the effect of carelessness can be overcome by a regular maintenance program. For instance, if leaky faucets are repaired as fast as leaks develop, the bad habit of turning the handles off too tightly needn't develop at all, for the water always shuts off when the valve is lightly closed, as it should be.

A dripping faucet not only means accelerated wear on the mechanism, but large water losses. A steady dripping will waste more than 24 gallons of water a day—almost 9000 gallons a year. If a large number of faucets are dripping, extra water costs can be considerable. Moreover, if a leak gets so bad that a stream of water as small as an



Dirty fixtures encourage abuse by plant personnel. This man might not have used the lavatory as a shoe-shine bench if the fixture had been spotlessly clean.



Be sure that drains are kept free flowing. If a lavatory drains off slowly, sediment in the water will be deposited on the sides of the bowl. Very few users are patient enough to wait long enough to flush the sediment down.

eighth of an inch in diameter is running, it will only take about 3 days to waste 9000 gallons—that's over a million gallons a year thrown away from a single faucet! Add up the losses from even a half dozen faucets leaking a one-eighth-inch stream all day and all night long and you really have a water bill!

Systematic Cleaning

A regular cleaning program is important. In the home it may be sufficient to scour the plumbing fixtures and trim once or twice a week, but not in a washroom used by dozens or hundreds of people daily. Here a daily cleanup is a minimum requirement. In a wash-

room where traffic is heavy, two or more cleanups per day may be necessary. Such a planned cleanliness program engenders a greater feeling of respect for the equipment among users. A man is not nearly as likely to put a hob-nailed shoe up on a lavatory rim to tie his shoe laces when the lavatory is sparkling clean as he is when the lavatory is dirty with soap scum and drippings.

Here is something to remember in cleaning vitreous china or porcelain-enamel plumbing fixtures. Fixtures can be abused in cleaning as well as in use. Most people don't realize that these gleaming white surfaces are virtually the same glass surfaces that make for quality in

the finest mirror or window glass. How many scrub-up men would scour the washroom mirrors with a harsh cleanser, or pumice or sand? The thought makes you recoil? But we see it done every day to washbasin surfaces—yes, we have even seen people use sand to scour washroom lavatory surfaces, which have every bit as fine a finish as an expensive plate-glass mirror.

Handle with care if you would have plumbing fixtures that are glistening and gleaming for their lifetime. If you would know whether the cleanser you use will scratch the surface, take two pieces of ordinary glass and put a bit of cleanser between them. If rubbing the pieces together produces scratches on the glass, there is abrasive material in the cleaning agent that will just as surely scratch your fixture surfaces. Tiny scratches, to be sure, hardly noticeable, but continued use of the cleanser will add more and more of the tiny scratches until the glistening finish has been destroyed. Don't be fooled by certain "fast" cleaning agents that derive their cleaning abilities from harsh and crude abrasives. Once the gloss is gone, the surface will be hard to clean, for dirt will become imbedded in the tiny scratches and will defy attempts at removal.

Careful Cleaning

Treat fixtures with care in cleaning, and cleaning will always be easy, instead of becoming progressively harder. You have never seen a window that required "elbow grease" to clean. A little soap and water will remove the most stubborn dirt from a window. The same is true of plumbing fixtures. Stains and dried grease accumulations do not have to be scoured away with abrasives. For a particularly stubborn bit of grime, attack the surface with a generous amount of hot water and a stiff bristle brush. Use plenty of soap to remove grease. Certain cleaners are satisfactory, but don't use a cleanser without first giving it the "glass test" between two pieces of glass. If the glass scratches, don't use this cleanser on your plumbing fixtures. If there is no sign of a scratch on the test glass, the cleanser is fine for this use.

Bear in mind that regular cleaning daily, or oftener, makes surfaces easier to clean. Don't give the dirt a chance to get set so that heavy scouring is necessary.

Abusive habits of the cleaning personnel can be the cause of

marred fixtures. Scrub-buckets are a major cause of marring on fixture surfaces. Cleaning personnel slams a bucket down on a toilet rim in order to empty the bucket. Or a bucket is carelessly scraped around in the bottom of a utility sink. The inevitable grinding and scraping produces scratches on the surface. Such a practice should be avoided. Rubber mats are available for protection of sink bottoms, and sink rims can be equipped with metal shields to prevent buckets and cleaning tools from marring the rims. Toilets should not be used for dumping buckets if utility sinks are provided for the cleaning personnel.

Proper Maintenance Important

Keeping drains in condition is another important part of plumbing fixture maintenance. When any fixture runs off slowly, it should be given immediate attention. Slow runoff not only causes wasted time and exasperation for the user of the fixture, but it increases the dirt accumulation on the fixture. Slow runoff is unsanitary. The old standby, the "plumber's" friend", the rubber suction plunger, should be on hand at all times, for if quick action is taken with this tool whenever a lavatory or sink plugs up, the difficulty can usually be cleared up quickly.

Stops-ups can be avoided almost entirely if all fixture drains are treated monthly with a good caustic lye solvent compound. Never allow the solvent to remain in the bowl. Always flush down any surplus into the trap immediately. If directions are followed carefully, no harm can

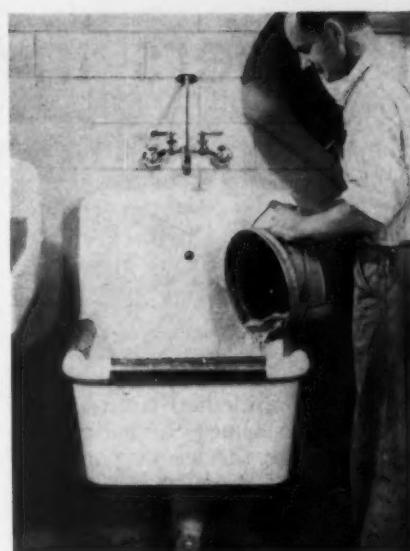
come to the fixture from use of this material. If drains are allowed to become badly clogged from lack of proper maintenance, it may be necessary to disassemble traps entirely to clear up a clogged condition or to use a special plumber's drain cleaner to reach the clogged area. If a slow-acting drain is not treated immediately, the clogged condition may extend into the piping for some distance beyond the trap because the slow movement of the water allows solids to settle out. Eventually the condition may become so bad that it is necessary to tear out walls and piping.

If fixtures are frequently and thoroughly cleaned, the surfaces will remain bright and glistening. If cleaning is neglected, however, certain substances may build up what appear to be stains on the surface, especially in areas that have mineral-bearing waters. If the fixture is of an acid-resistant material (all vitreous china is acid-resistant; certain enameled iron fixtures are acid-resistant, and will be so marked or initialed), a mild acid solution may be used to remove the surface accumulation. An oxalic acid solution of 5% strength can be swabbed over the affected surface, then rinsed off with clear water when the stain has dissolved. If the accumulation is extremely bad, a 10% solution of muriatic acid should be used. Use rubber gloves when applying this solution and take care not to leave the acid on chromium parts, for the acid will corrode the chromium if allowed to stand.

Drinking Fountains

Drinking fountains, too, come in for their share of troubles. On a hot day, the valve on a drinking fountain may be opened and closed more often than any other valve in the building. Sometimes drinking fountain valves or handles stick, leaving the water running. Sometimes closing springs break. Such troubles should be corrected immediately, for water wastage can be tremendous with constant-running drinking fountains. A stuck fountain is usually running at virtually full flow.

Another common trouble of drinking fountains is poorly adjusted flow control. Most modern drinking fountains have an automatic stream regulator, but there are a few installations that do not have this device. It is almost impossible to control flow properly without the regulator, for no matter how carefully the original flow setting is made, variations in water pressure are bound to occur, with the result that the

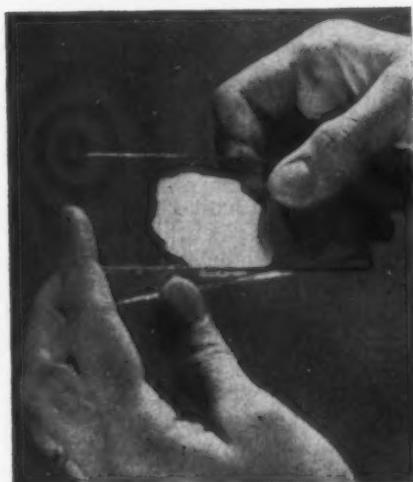


Protective metal edgings lengthen the life of utility sinks.

stream is merely a dribble at times, and at other times shoots clear of the bowl onto the floor. The stream regulator corrects this tendency by automatically increasing flow when pressure is low and decreasing flow when pressure rises. It is recommended that such a device be installed where a drinking fountain is not already so equipped.

Even with automatic stream regulation, however, the regulator setting should be checked from time to time, for wear within the mechanism can change the flow. Most regulators are the rubber diaphragm type, and in time the diaphragm may need to be changed. Valve seats and rings need repair periodically just as in any standard faucet. Abuse of the mechanism frequently results where stream flow is not kept normal. If the flow is not adequate, exasperated users will try to turn the valve handle beyond its normal stopping point, and some may succeed, damaging the mechanism. Some become angry and kick or hammer the handle or tamper with the bubbler. If the flow is too strong, funsters take delight in seeing how far beyond the bowl they can squirt water, with the resultant mess and floor-slip hazard.

Care of plumbing is not complicated or difficult. Any cleaning staff can be taught quickly the necessary procedures of regular maintenance. Most important is the establishment of a regular program to keep the sanitary plumbing equipment working and looking its best at all times. If this is done faithfully, the equipment will last and retain its beauty for the life of the building.



The "glass test" can be used to determine if a cleanser is suitable for use on your fixtures. If the glass scratches, harmful abrasives are present in the cleanser.

Partners in Production

• By Grey Leslie

The true aim of enterprise is neither profits nor security, but production of goods.

A practicable program can be built by seeking areas of agreement rather than conflict.

Much more progress has been made in this direction than most people realize.

THE Twentieth Century Fund has performed a major and timely public service in publishing "Partners in Production," a report compiled by its Labor Committee. It is not a large book—it says its say in the compass of 149 pages. Purchasing agents will find it an able and stimulating study of a topic that is of increasing importance to them in their progressing responsibilities to their own managements and to their co-workers.

The significance of this book lies largely in its prophetic quality. Much that is being currently written on labor problems puts the emphasis on the divergencies in thought. Problems are not solved by that approach. The purpose of these authors has been to discover the objectives already shared by management and labor, and, where there are wide differences of opinion and practice, to suggest principles and methods that will guide both toward a common goal.

Much more of this goes on in our industrial life than the general public is aware. The strikes and wrangles between labor and management preempt the headlines, but there is a substantial total of unspectacular cooperative movements, and thousands of labor-management problems are being quietly and undramatically settled daily.

It is the purpose of the study by the Committee's broad representative membership, to widen the knowledge of existing successful labor management relationships, and to stimulate an intelligent interest on the part of every citizen. It will realize the purpose of its publication only if it achieves a wide reading by the very citizens whose attitudes and understanding will develop an enlightened public interest in the collective relationships of industry. Purchasing agents are in position to make a measurable contribution to this end.

For some months past, the Congress has been busily and at times noisily occupied in hammering out labor legislation to revise or replace

the Taft-Hartley Act. It is generally recognized that all social relationships require some satisfactory framework of law within which they operate, and labor legislation probably has to do with the widest and most important segment of American life. But it is highly significant to consider that about all the law can do is to provide the framework. The practical working relationships consist of an accumulation of understandings and methods of doing things. Lacking the dynamic ingredients of confidence, mutual respect and fair play, all the permissions or restrictions of law are likely to be ineffective and oftentimes utterly meaningless. Casuistry never was an American characteristic.

The actual dealings of labor unions and managers are to-day taking on a wholly new and different character. Yet the implications of improved joint relations have heretofore been inadequately explored. This little book amply satisfies that need.

The central theme of the study is that a new concept of labor-management relationships is now demanding recognition. Realistic measures are offered to all who are interested. They will enable and encourage a forward movement away from wrangling over the division of corporate income and promote a greater concern for its creation.

If the book did no more than point up the growing sense of responsibility toward the mutual problems confronting labor and management, it would have served a most useful purpose. But it does far more. It defines ways and means of labor and management working together, which if widely accepted and ex-

tended will result in solid achievement. It provides insights for understanding and clues for handling resistant responses to innovations for increased productivity.

"There is no conflict between management and labor over the question of giving some dignity to the worker and his job; there is only ignorance about how to do it," says the report.

In the light of the recorded experience of the Committee members, ignorance of possible solutions and accomplishment, or unwillingness to recognize the common problems, are inexcusable.

The Committee envisages one labor goal and one management goal on which there may be real conflict of interests, but it indicates a potential compromise that should satisfy both sides.

"Management's chief goal—a profitable and efficient enterprise—is no more completely satisfying to labor than the worker's goal of security is to his employer. At best, both leave the other somewhat apathetic . . . The profit system is not primarily a system for personal gain of the management and the workers . . . It is a highly effective system for producing and distributing goods. The social value of profit lies, not in its use as a reward for individuals, but in its objective yardstick. This yardstick measures, (not always perfectly, it is true) whether the goods and services produced are what people want and also whether the work of producing them is being done effectively."

It is now commonly recognized that in order to maintain our present high living standards we must arouse an enthusiasm for produc-

(Please turn to page 322)

Georgia Power Company Purchasing Procedures and Forms

● By J. R. Carmichael

**Supervisor of Purchases and Stores
Georgia Power Company
Atlanta**

PURCHASING, Stores, and Traffic are coordinated in one department at the Georgia Power Company. The Supervisor of Purchases and Stores reports directly to the Vice President in charge of Operations. Buying procedures follow generally accepted practice, and the basic forms are self-explanatory.

Division Supervisors of Supplies at Atlanta, Augusta, Athens, Columbus, Macon, and Rome, as representatives of the Purchasing and Stores Department, are authorized to issue local emergency orders within certain well defined limitations. Such orders are promptly reported to the central office, with supporting invoices.

The Department makes a daily record of all orders issued, with cumulative totals for the year to date, showing number of orders issued and dollar value, under four general classifications as shown on the form herewith.

The General Storekeeper, who reports to the Supervisor of Purchasing and Stores, is in charge of all warehousing, storing, reclamation, and sale or other disposition of surplus and scrap material, both at the General Warehouse in Atlanta and for the six divisional operations. His office is located at the General Warehouse.

One of the key forms used in establishing stores policies on individual items is the Stock Authoriza-

tion. This form, with appropriate approvals noted, is the authority of the Stores Department (a) to requisition purchases for stock, (b) to discontinue items from stock when and as they become obsolete, and (c) to dispose of stock materials as surplus when they can no longer be used. Reasons for the decision are stated, and maximum and minimum stock quantities are established on this form.

Replenishment of stock items is

done by means of a Supply Requisition on purchasing, which serves as a work sheet in the buying section. The usual forms covering receipt, issue, transfer, and return of materials are used, and are posted to the Stock Record, which shows quantities ordered, and issued, with a current quantity balance for each item. Periodic storeroom inventories are taken, checked against book quantities and values, and any shortages or overages are adjusted.

MATERIAL AND SUPPLY REQUEST																	
To Stock Clerk at _____ Date _____ 19____					DISTRICT REQUISITION NUMBER _____												
Deliver to _____					STORES REGISTER NUMBER _____												
To be used at _____					CREDIT STOCK ACCOUNT NO. _____												
MATERIAL		Lot Number	Quan. Ordered	Quan. Filled	Unit	Price	* Amount	Account Number									
Form 5-15-4M Pads—5-14-42																	
GEORGIA POWER COMPANY																	
REPORT OF MATERIAL RECEIVED																	
PARTIAL SHIPMENT																	
Date _____ Order No. _____																	
Received at _____ Requisition No. _____																	
Express Way Bill No. _____																	
Freight Bill No. _____																	
Warehouse Receipt No. _____																	
Order Placed On _____																	
Received From _____																	
Car Initial and Number _____																	
NO. OF PACKAGES	WEIGHT IN POUNDS	DESCRIPTION			QUANTITY	LOT NO.	ACCOUNT			Approved							
5-15-4M—5-14-42																	
MATERIAL AND SUPPLY RETURN																	
To Stock Clerk at _____ Date _____ 19____					STORES REGISTER NUMBER _____												
Received From _____					CREDIT STOCK ACCOUNT NO. _____												
MATERIAL		Lot Number	Quan. Returned	Quan. Accepted	Unit	Price	* Amount	Account Number									
5-15-4M—5-14-42																	
STOREROOM INVENTORY																	
Acct. No. _____																	
Taken By _____ Date Taken _____																	
Inventory Quantity	Book Quantity	Short or Over	Lot No.	ARTICLE	Description	Price	Inventory Amount	Short or Over									
STOCK RECORD OF																	
DISTRIBUTION																	
ORDERED		RECEIVED AND ISSUED															
REQ. NO.	BATS COMP.	DATE	REQ. B. S. ON T. S. NO.	QUANTITY	BALANCE	DATE	REQ. B. S. ON T. S. NO.	QUANTITY	BALANCE	DATE	REQ. B. S. ON T. S. NO.	QUANTITY	BALANCE	DATE	REQ. B. S. ON T. S. NO.	QUANTITY	BALANCE
LOT NUMBER		ARTICLE								UNIT STOCK ACCOUNT							

A monthly inventory report of scrap on hand, by classification, amount, and location, is made to the General Storekeeper, who arranges for its disposition. Scrap is defined as "materials which have no useful value except that of the metals contained, and which have been accumulated for sale." All scrap at major points is sold on the basis of sealed bids, which are opened at a stated date and hour. A summary of all scrap sales made at the operating divisions is reported to the General Storekeeper's office each month.

Form S-1114-TH-S-12-69

GEORGIA POWER COMPANY
STOCK AUTHORIZATION

TO: PURCHASING AND STORES DEPARTMENT. **DATE:** _____

STOCK — DISCONTINUE TO STOCK — SCRAP

Quantity to Be Ordered or Scrapped	ITEM GIVE FULL DATA—CAT. NO.—DWG. AND SPEC. NO.	Unknown	Known

Reason for Stocking, Discontinuance, or Scrapping. Disposition of Present Stock, etc.	
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
Requested By	Approved
Approved	Approved
Approved	Approved

2-1487-2M-11-17-68

GEORGIA POWER COMPANY

Date: _____ 19_____

Gentlemen :

You are invited to name your best price on this blank, opposite items shown, on the following approximate quantities of scrap; FOB cars at point named unless otherwise specified. Offered subject to inspection and acceptance, with no warranty except as to title and no representation as to description or condition.

Purchaser is to pay all switching and freight charges after cars have been loaded.

Weights over scales selected by the seller are to govern, wherever possible. Railroad weights are to be used as a basis for settlement, when weights cannot be otherwise established by the seller.

The seller reserves the right to reject any bid in its entirety, any part of a bid, or all bids, and reserves the right to cancel any sale should shipping instructions not be received within forty-eight hours after notice of acceptance.

MATERIAL	APPROXIMATE WEIGHT	LOCATION	PRICE	UNIT

Report of Scrap Sales				19
Location	Sold To	Classification and Description	Quantity In Pounds	Unit Sales Price
		Aluminum - Pure		
		Aluminum - Cable with Steel Strand		
		Aluminum - Cast		
		Aluminum - Sheet		
		Brass - Red		
		Brass - Yellow		
		Brass - Mixed (Describe)		
		Brass - Borings (Describe)		
		Cooper - #1, Bare		
		Cooper - #2, Bare		
		Cooper - Insulated		
		Cooper - Alloy Trolley		
		Cast Iron (State if Burned)		
		Steel Rails		
		Railway Special Work		
		Miscellaneous Mixed Steel (Describe)		

Note: Compile as of the 23rd of each calendar month. Mail immediately to the office of the General Storekeeper. Include all sales of scrap, regardless of whether sold from stock or not.

Weights shown hereon should agree with those shown by miscellaneous sales orders.

Signature

The Purchasing and Stores Department handles all expediting and traffic work for the entire company. Transportation facilities for each source of supply are a matter of record, and are kept up to date by means of a form letter request for information.

Bills of lading, carriers' receipts, etc., are the uniform standard documents for these purposes. Internal records include a daily report on freight cars — arrivals, loadings, releases, and number in the yards; a daily report of petty freight disbursements; and a daily and cumulative report of freight bills paid, by number of bills and dollar totals.

GEORGIA POWER COMPANY

GENTLEMEN:

So that we may give you correct routing of material to be shipped on our purchase order No. _____ to _____ Georgia, we ask that you answer the questions below:

Shipping Point _____

Railroad serving your plant _____

If more than one railroad serving your plant, your preference of initial carrier _____

It will be appreciated if you will furnish this information at once.

Yours very truly,

Assistant Traffic Manager

REClay/mm

D-212-12M-5-10-48							
GEORGIA POWER COMPANY							
TRACING REQUEST							
1. PURCHASING DEPT., TRAFFIC SECTION, ATLANTA	OFFICE _____ DATE _____						
2. STORES DEPT., 211 DECATUR ST., ATLANTA	ORD. NO. _____ DATE _____						
3. STORES DEPT., APPL. REPAIR PARTS SECTION 211 DECATUR ST., ATLANTA	REQ. NO. _____ DATE _____						
4. DIVISION SUPERVISOR OF SUPPLIES	VENDOR _____						
5. DIVISION ENGINEER							
PLEASE ADVISE AT YOUR EARLIEST CONVENIENCE							
QUANTITY							
A. _____	_____						
B. _____	_____						
C. _____	_____						
D. _____	_____						
E. _____	_____						
F. _____	_____						
REPLY BELOW (BY ITEM, IF NECESSARY)							
A. _____	_____						
B. _____	_____						
C. _____	_____						
D. _____	_____						
E. _____	_____						
F. _____	_____						
TRACING DIRECTIONS (CHECK ONE)							
1. PURCHASING DEPT., TRAFFIC SECTION	_____						
2. STORES DEPT., 211 DECATUR ST.	_____						
3. STORES DEPT., APPL. REPAIR PARTS SECTION 211 DECATUR ST., ATLANTA	_____						
4. DIVISION SUPERVISOR OF SUPPLIES	_____						
5. DIVISION ENGINEER	_____						
TWO COPIES No. 1 to Auditor with Freight Report No. 2 for Storekeeper's Record							
D-212-2M-5-1-48							
DAILY REPORT OF FREIGHT DISBURSEMENTS							
GEORGIA POWER COMPANY							
TO AUDITOR:							
Petty Freight Disbursements for _____							
19 _____ are listed below:							
Date of Bill	Carrier	Pro. No.	Amount Paid	Receipt No. Warehouse	Weight	Picked Up or Delivered By	REMARKS
Form 1-212 D-2M-5-5-48							
FREIGHT CAR REPORT							
Report of cars in _____ yard for _____							
24 hours ending 7 A.M. _____ 19 _____							
Initial	Number	Content	Received Date _____ Time _____	Released	Remarks		
Form 1-212 (Rev.)-1M-7-15-48							
PURCHASING DEPARTMENT							
Traffic Section							
DAILY REPORT							
Date _____							
	Paid In Atlanta		Paid By Draft		Paid Outside Atlanta		Total
Freight Paid This Year to Date	C. L.	L. C. L.	C. L.	L. C. L.	C. L.	L. C. L.	
Freight Paid This Date							
Total Freight Paid This Year to Date							
Number of Bills Paid This Year to Date							
Number of Bills Paid This Date							
Total Number Bills Paid This Year to Date							
No. of cars in yard last report _____ Received _____							
Released _____ Loaded _____ In yard today _____							
Signed _____							
Notes—This report to be made out every day at 7 A.M. even if no cars to report. If car is held more than 24 hours show cause in remarks column.							

Shortages and damaged shipments are promptly reported to the Traffic Section by receiving stations, in full detail. Claims for loss and damage, and for overcharges, are made on the standard forms. The department maintains a looseleaf file of all claims entered, pending settlement.

5-1230-4M-1-18-48
REPORT OF MATERIAL RECEIVED SHORT OR DAMAGED

COMPANY

(Insert Name of Company)

Date _____ 19_____

J. O. No. _____

LOCATION _____

W. H. MURRAY, Traffic Manager,
Purchasing & Stores Dept.,
Electric Building,
Atlanta, Georgia.

Gentlemen:

Parcel Post
Freight

This is to notify you that _____ have received a shipment via Express on _____, 19_____
which checked damaged short the following: (If major appliance, show serial number) State location and nature of
damage _____

5-2456-4M-10-17-48

Standard Form for the Handling of Concealed Loss and Concealed Damage Claims

(Recommended by Committee of Shipping Interests and the Conference Committee of The Freight Claim Association in joint session, New York)

CONSIGNEE'S FORM

Information in Lieu of Affidavit Required from Consignee in Support of Claim for Concealed Loss or Concealed Damage.

Shipper's Claim No. _____ Consignee's Claim No. _____

DESCRIPTION OF SHIPMENT

Date _____ Number of Packages _____

Point of Origin _____ Destination _____

Shipper _____ Consignee _____

Commodity _____

is covered by Express Freight Bill No. _____

Quotation Order No. _____

R. R. Co. Express was notified and inspection of shortage damage was made _____

de on Freight Express Bill which has been forwarded attached to ex-

5-2456 A-509-10-18-45
Standard Form for the Handling of Concealed Loss and Concealed Damage Claims

SHIPPER'S FORM

Information in Lieu of Affidavit Required From Shipper in Support of Claim for Concealed Loss or Concealed Damage

Shipper's Claim No. _____ Consignee's Claim No. _____

DESCRIPTION OF SHIPMENT

Point of Origin _____ Destination _____

Date _____ Number of Packages _____

Shipper _____ Consignee _____

Commodity _____

INFORMATION REQUIRED

ANSWERS

1. When were the goods packed, if known?

(a) Where were the goods packed? _____

2. Were all the articles for which claim is made packed in container and in good order? _____

5-1435-2M-11-17-45

GEORGIA POWER COMPANY
ATLANTA, GEORGIA

Standard Form for Presentation of Overcharge Claims
(Approved by the Interstate Commerce Commission, December 2, 1913)

(Name of person to whom claim is presented) _____ (Address of claimant) _____ (Claimant's Number) _____

(Name of carrier) _____ (Date) _____ (Carrier's Number) _____

(Address) _____

This claim for \$ _____ is made against the carrier named above by Georgia Power Company, for
Overcharge in connection with the following described shipment:

Description of shipment:

Name and address of consignor (shipper):

Shipped from _____ (City, town or station)

Final Destination _____ (City, town or station)

Bill of Lading issued by _____

Paid Freight Bill (Pro) Number _____

Name and address of consignee (Whom shipped to):

If shipment recognized en route, state particulars:

Nature of Overcharge _____

(Weight, etc.)

Note—If claim covers more than one item taking into account how overcharge is determined

No. of Pcs.	ARTICLES
Charges Paid:	
Should have been	

Authority for rate or classification claimed _____

IN ADDITION TO THE INFORMATION ARE SUBMITTED IN

- { 1. Original paid freight ("expense") bill.
- { 2. Original invoice, or certified copy, when bill of lading is not issued.
- { 3. Original bill of lading, if not previous claim is based on misvaluing or valuation.
- { 4. Weight certificate or certified statement when applicable.
- { 5. Other particulars obtainable in proof of Overcharge claimed.

5-2238-1M-1-5-47

Consignee	Our No. _____
Address	R. R. No. _____
Shipped from	Date _____
Via	Filed with _____
Bill of Lading issued by _____	Title _____
Date _____	Paid freight bill No. _____
Car No. _____	Initials _____
Description	Address _____
Complaint	Amount _____
	Additions _____
	Deductions _____
	When Closed _____
	How _____

Sources and Uses of Specifications

By George Brand

Well drawn specifications can be one of the most useful tools in purchasing.

Not all purchased materials are in the class of "specifications items".

Stick to established trade standards and specifications wherever possible.

Specification: A statement containing a minute description or enumeration of particulars, as of the terms of a contract, details of construction not shown in the architect's drawings, also any item of such statement."

In recent years the practice of buying on specifications has gained widespread acceptance. The term "Specifications", from the purchasing agent's viewpoint, covers a wide range. It means not only setting forth the required characteristics of the product in its physical, chemical and electrical qualities and chemical composition, but may also specify the materials and method of manufacture, performance, dimensions and tolerances. It often indicates the means and time of delivery, the type of inspection to be employed, the manner of packaging and other important items.

However, care must be taken to avoid placing undue restrictions on the quality of the product that would add to the cost of the item and to the difficulty of procurement without adding to the value of the product.

All items of purchases are not "specification items" in the sense that a special definition is needed. Industry has standardized many products to the point where the establishment and the acceptance of grades are so well understood by the buyer and seller alike that special descriptions are not necessary. Gears are standardized as to the type of material, type of tooth, pitch diam-

eter of the teeth, bore and face length. Numerous other items are standardized by physical qualities in the same manner. Other products may be standardized as to their chemical composition, as are drugs. Some products may be standardized by a combination of all the qualities. This, obviously, presents a problem when the buyer's activities cover a wide range of products, but it does provide a definite terminology that has a specific meaning in the respective trades. The advantages of these trade customs are obvious. Buying in terms of standard market grades insures the buyer of competitive sources, constant availability of products, regular marketing channels, and comparability of products between various companies.

A specification accurately and adequately written denotes that definite thought and careful study have been made as to the use for which the material is intended and as to the characteristics of the material which will be satisfactory. Likewise, a specification carelessly drawn gives evidence of inadequate preparation and is often of little or no value, especially in the procurement of industrial equipment.

In preparing a specification, we must describe the article in the most accurate and clearest manner possible. We may use physical or chemical characteristics, materials or methods of manufacture, performance, or a combination of several or all.

Stuart F. Heinritz, in his book "Purchasing", gives a good basis for a specification:

(1) State exactly what is wanted—clearly, definitely, and completely.

(2) Provide the means or the basis for testing deliveries for conformation with the specification.

(3) Avoid non-essential quality restrictions that add to the cost and

to the difficulty of procurement without adding to the utility and value.

(4) Avoid definitions that unnecessarily restrict competition.

(5) Conform, so far as possible, to established commercial and industrial standards, and to company standards for other materials in regular use.

There are three primary sources from which specifications may be derived: (1) standards set up by the individual buyer with the co-operation of the engineering and production departments or by a special committee set up for this specific purpose; (2) standards set up by private agencies, technical associations, suppliers, or other users; and (3) standards set up by various branches of the Government.

If there is no commercial standard available for the article to be purchased, a specification must be written by the individual buyer. This specification should originate from the hands of those most familiar with the use of the article. This is to insure that the proper quality is specified, that proper terminology is used and that proper checks are set up for the testing of the product. The completed specification should be sent to the Purchasing Department to be checked and compared with existing industry standards. Here, with the Engineering Department's approval, they may revise the specifications to comply with certain standards which will increase quality, decrease expense, or decrease delivery time.

Shown herewith is a typical specification which originated in the engineering department of a large company. Specification "A" is the copy which was drafted in the engineering department by the technical men who actually wrote the

(Please turn to page 316)

Mr. Brand's article is the prize paper in the 1949 Students Contest sponsored by the Milwaukee Association of Purchasing Agents as a part of its educational program.

SPECIFICATION "A"

Eng. Dev. Div.

1/2/49

**TENTATIVE MATERIAL SPECIFICATIONS FOR
DIMENSIONED (CUT) MICA SPLITTINGS****I. SCOPE**

These preliminary specifications are for mica splittings to be used as the dielectric material in capacitors. They are intended to give only general information on the essential characteristics in the capacitor dielectric and should not serve as a basis for rejection or acceptance of material.

II. MATERIAL

Mica splittings should be Muscovite (White India) #4 grade, quality clear as classified by ASTM J418.

III. THICKNESS

It is desired that the dimensioned mica splittings be furnished in thicknesses of not less than .0080 or more than .0086. The average thickness of the splittings should be .0033. The splittings should be perfectly flat and of uniform thickness throughout and should consist of hard transparent sheets without surface defects.

IV. DIMENSIONS

The dimensioned (cut) sheets shall be accurately cut to a rectangular shape which has sharp corners and clean-cut edges, with no imperfections which may cause breaking of the edges during normal handling. The dimensions of this rectangle shall be .750 inches wide and 1.000 inches long, with a tolerance on both length and width of +.009 inch and -.000.

V. WORKMANSHIP

The workmanship should be first class in every respect.

VI. TREATMENT

The mica shall not be calcined or treated in any manner which will adversely affect its suitability for the purpose intended.

VII. DIELECTRIC STRENGTH

The dielectric strength of the mica splittings, as determined by the one minute step by step test ASTM P980, shall in no case be less than 500V/mil thickness of the sample to be .0018.

VIII. POWER FACTOR

The power factor of the mica should not be greater than .10 percent for a range of frequency from 60 to 1000 cycles as determined by testing at 20° C.

IX. DIELECTRIC CONSTANT

The mica splittings should have a specific inductive capacity of not less than 10.0 when tested at room temperature 20° C.

Refer to
John P. Slow
Product Engineering
Engineering Dev. Div.

JPS:sj

SPECIFICATION "B"

Eng. Dev. Div.

2/2/49

**SPECIFICATIONS FOR
DIMENSIONED (CUT) MICA SPLITTINGS****I. MATERIAL**

Mica splittings should be Muscovite (White India), quality clear and slightly stained as classified by ASTM J418.

II. THICKNESS

.002 inch ±.0025. The average thickness should be .0018

III. DIMENSIONS

Length: 1.000 +.0010
 -.0000
Width: 0.750 +.0010
 -.0000

The splittings should be cut to a rectangular shape which has sharp corners and clean-cut edges, with no imperfections which may cause breaking of the edges during normal handling.

IV. DIELECTRIC STRENGTH

The dielectric strength of the mica splittings as determined by the one minute step by step test ASTM P980 should be not less than 500V/mil thickness of sample, .0018.

V. POWER FACTOR

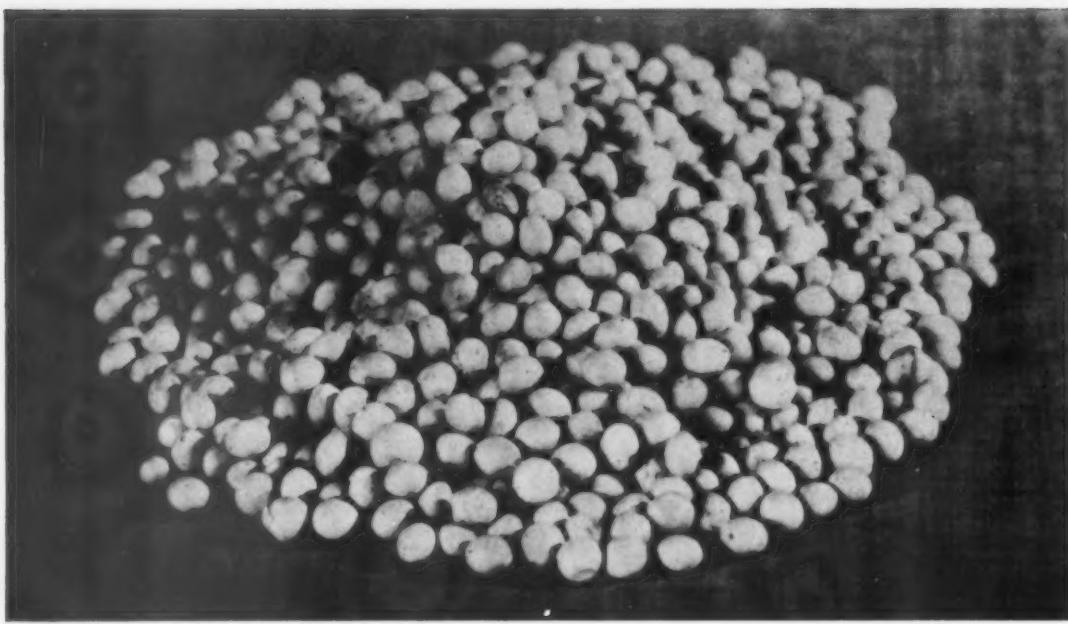
The power factor of the mica should not be less than .10 percent for a range of frequency from 60 to 1000 cycles at room temperature 20° C.

VI. DIELECTRIC CONSTANT

The mica splittings should have a specific inductive capacity of not less than 10.0 when tested at room temperature 20° C and a frequency range of 60 to 1000 cycles.

John P. Slow
Product Engineering
Engineering Dev. Div.

JPS:sj



SOYBEAN OIL . . . A Versatile Material

● By Phil Glanzer

LIKE Jack's beanstalk in the familiar fairy tale, the soybean has grown into one of the giants of the plant world, and some of its branches are reaching into many important phases of modern industry.

The story of its rise from obscurity to fame is told by Dr. Ralph H. Manley, Director of Research for General Mills. "Legend," says Dr. Manley, "takes the soybean back to the Chinese emperor Shennung, who 2,838 years B.C. established himself as the father of Chinese agriculture. Since that time, it has on many occasions saved parts of the Oriental world from starvation. It has also become economically indispensable to areas of the Occident, and in two world wars has provided ammunition and helped alleviate fat and protein shortages in the United States," he says.

"With the exception of those who raise or process soybeans, average Americans little realize that the soybean is now our greatest source of

A wartime substitute that has earned a place on its own merits.

Technical progress has evolved many useful food and industrial applications.

Large domestic industry has developed from relatively obscure import status.

vegetable oil. The public regards it as a means of soil fertilization, as a hay crop and livestock feed. While it is true that soybean protein as a feed for animals occupies an important place in our agricultural economy, soybean oil also plays an important role in our industrial economy. U. S. and Canadian processors now produce more than a billion pounds of soybean oil annually."

The soybean came to North America about 140 years ago, but attracted little attention until a century later, when World War I

threatened a fat starvation by isolating this country from foreign sources of coconut and other important vegetable oils. During this period, that shortage was averted by imports of soybean oil from the Orient. During 1918, the United States alone imported some 335 million pounds of this golden yellow fluid, then an all-time high. Much of this Oriental oil, however, was of inferior quality, and the taste that it left in the mouth—literally and figuratively—was not entirely favorable. Nevertheless men of vision saw its potentialities, and by 1922,

soybean oil was produced domestically to the extent of one million pounds.

In addition to its food and fertilizer value, the soybean found useful applications in the manufacture of soaps, lubricants, rubber compounds, varnish and paint oils, glycerine, adhesives, insulation, mastic flooring, and plastics.

Since the soybean had been virtually unknown or unappreciated for several thousand years, its sudden fame gripped the imagination of the journalist and scientist alike. While the latter proceeded cautiously in his laboratory, the former wrote glowing, romantic, and distorted tales about this "agricultural Cinderella". Newspapers reported that a famous automobile manufacturer wore a suit spun from soybean protein, and the public began to expect soybeans in everything from paint to chocolate sodas. Many of the claims were obviously exaggerated, but these very exaggerations served as a challenge to the scientists who set out to make some of them come true.

Although virtually every part of the soybean has been utilized in one way or another and has contributed to its commercial success, much of its nutritional and technical value has come from the oil, which comprises about 19% of the bean. After the first million pounds of soybean oil was produced in 1922, production mounted steadily. However, developing soybeans as an industrial material was an uphill grind, for farmers had to be sold on the economic feasibility of soybean crops. As recently as the 1930s, it was not uncommon for purchasing agents who were seeking convenient domestic sources of soybean oil to tour the farming areas, persuading the farmers to put some of their acreage into this new crop and offering the inducement of guaranteed markets.

Processors too were wary of making any substantial capital investments to produce an oil which had not yet proved itself. Most important of all, the scientist had to answer many questions: How could the oil best be processed? In what way was it superior to competitive oils? In what ways was it inferior, and how could it be improved? For what uses was it especially adaptable?

Slowly, step by step, the scientists answered these questions. The agronomists found ways to increase the oil content of the bean, shorten its growing period, and increase its yield per acre. Agricultural stations worked with farmers in learning how to produce soybeans better adapted

for processing. Engineers developed more efficient procedures of oil extraction. Edible oil processors discovered techniques for processing the oil for food purposes and removing its bitter taste. Paint manufacturers lifted soybean oil from the position of an undesirable substitute to a material which possessed desirable properties not found in the faster drying linseed oil.

So it was that when World War II again cut off supplies of imported oil, while at the same time quantities far above normal needs were required, soybean oil rose to the occasion. In 1944, 1.2 billion pounds of this oil were domestically produced.

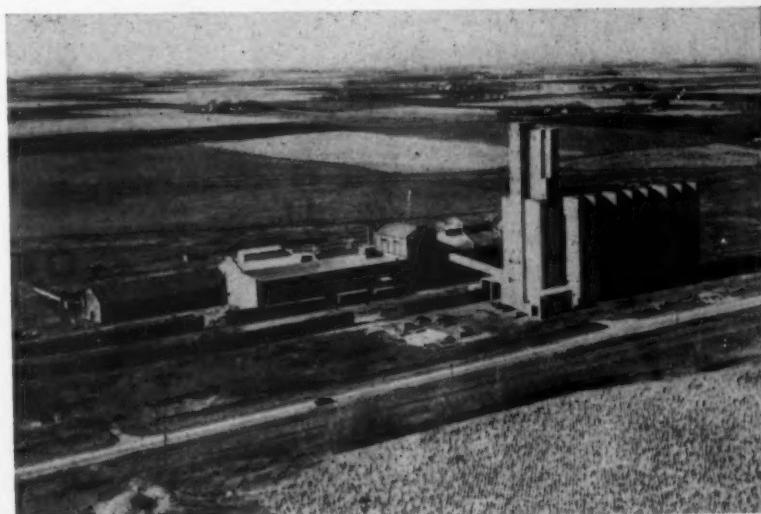
During the late war, about 90% of all soybean oil went into edible products—chiefly shortenings and

butter substitutes, but with substantial quantities in salad oils, sardine and tuna fish canning, potato chip manufacture, soup mixes, and prepared flour. The other 10% found its way into a variety of commercial products—paint and varnish, soap, linoleum and oilcloth, printing inks, among others. The soybean meal was utilized as cattle feed and fertilizer, glue, and as a filler for molded plastics.

Each of these useful applications is a story in itself—a story of imagination and foresight on the part of men who saw in the lowly soybean something more important than the constituent of a bean bag, a story of patient research and experiment, a story of constructive cooperation between agriculture, science, and industry.



Soybeans have become an important crop in American agriculture during the past dozen years, with growing food and industrial markets.



General Mills' soybean processing plant at Belmond, Iowa, in the heart of a rich growing area, typical of a large new industry.

Profits Through Patent Protection

By Leo T. Parker

Purpose of patent law is to stimulate invention for broad public benefit.

You can't patent an idea—only the means for accomplishing it.

How to prove priority in original conception and final perfection of a patentable item.

RECENTLY a reader wrote in part, as follows: "How can I get protection on my inventions without spending money to obtain patents? I have accumulated many good inventions the past few busy years and now I have extra time to develop and market these seemingly profitable ideas. The thing that worries me is that the total cost of obtaining a patent on a simple invention runs \$200 and more. And a patent lawyer quoted me \$750 to file an application for a United States patent on one of my complicated inventions. Please advise me what I can do to eliminate these expenses and show drawings and models to demonstrate the practicability of my inventions."

First, it is well to explain that no plan for protecting an inventor against unauthorized appropriation of his invention is equal to filing an application for a patent in the United States Patent Office. There are, however, certain and definite procedures by which an inventor may delay filing an application for a patent while experimenting, perfecting and financing his invention. The reason for this law is that the first, exclusive and sole purpose of our patent laws is to cause persons with inventive genius to exert their ability and produce new and useful things so that the public and all persons will benefit.

Our first patent laws were enacted in 1784. England likewise. Since then all historians have marveled at the rapid advancement in the "modern machine age". Before present patent laws were passed no person had any inducement to exert his inventive ability to produce new

and useful things except for personal benefits arising from making use of *his own* inventions. Hence, for example, Daniel Boone used exactly the same rifle handed down by his father, and Daniel Boone's son was happy to inherit the *same identical* rifle. There was not enough benefit derived by Daniel Boone or his father in expending time, money and effort to improve his rifle merely for his own *personal* benefit. The incentive was not sufficiently great.

But after it became generally known that the United States offered the exclusive right to inventors to *make, sell and use* their inventions for 17 years, then came the rapid strides in advancement of industry. Not only could inventors benefit personally from inventing new and useful things, but also successful inventors became rich by selling their inventions without competition to all persons in the United States. In a majority of instances exaggerated stories of inventors becoming wealthy began to circulate. That stimulated and induced all persons to exercise their inventive genius. Hence, our present modern civilization and advancement in mechanics, chemistry, and other scientific endeavors is a direct result of our patent laws.

All previous "patent" laws were designed to make inventors or patentees rich. Far back in the early history of England the word "patent" was created by the King of England who gave to his influential friends and supporters the exclusive rights to import or sell the necessities of life such as salt, sugar, flour, and the like. By this plan, the holders of these valuable patent

grants were induced to perpetually support the king by being enabled to support exorbitant prices for their products from the general public, and thus earn a luxuriant livelihood with little effort. Quite obviously, these laws accomplished nothing to benefit either the general public or industrial firms.

Modern Protection

Therefore, all inventors who have in mind obtaining protection on their new ideas should remember, first: The United States Patent Laws were formulated *especially* for the purpose of creating interest in inventors and to induce them to exert their inventive genius toward inventing new and improved things to benefit the general public; second, the patent laws were *not* formulated for the purpose of enabling inventors to obtain exorbitant prices for patented products and become rich; third, our laws were devised for the primary purpose of inducing inventors to file in the United States Patent Office applications for patents in which details of the invention must be illustrated by drawings and clearly explained in the specifications; fourth, to have records of all applications for patents available for public inspection so that after expiration of a patent any person may consult the Patent Office files and learn how to make the invention.

Hence, inventors should realize that any inducement offered by our present patent laws is primarily to benefit the public. See the leading higher court Willis, 21 How. 322. Here the court said:

VITAL POINTS ON PATENT OWNERSHIP

No plan for protecting an inventor against unauthorized appropriation of his invention is equal to filing an application for a patent in the United States Patent Office.

After an inventor has secured a patent he can hold the exclusive monopoly or even secrete his invention and prevent others from making, using or selling it, for a period of 17 years. After expiration of this period his invention, descriptions and specifications are "public property."

If a company's employee obtains a valuable patent, who owns the patent? The employee owns it unless the employer proves that the employee was (1) hired to experiment and devise new inventions; (2) or the employee perfected the invention during the time he was being paid by the employer.

The inventor who proves that he was the first to conceive and the first to perfect an invention is NOT entitled to a patent against another inventor who was the last to conceive but the first to make an operative model of the invention.

"It is undeniably true, that the limited and temporary monopoly granted to inventors was never designed for their exclusive profit or advantage; the benefit to the public was another and doubtless the primary object in granting and securing that monopoly."

Therefore, inventors must keep in mind that everything done and all experiments made before filing an application for a patent must be in the form of written records, properly signed and dated.

Need Not Disclose Invention

It is true that there is no law compelling an inventor to disclose his invention to the public. He may keep it a secret if he so desires. Thus the public will be denied benefits, but at the same time the inventor forfeits his monopoly of earning a profit from making, selling and using his invention. After he has applied for and secured a patent he can hold the exclusive monopoly or even secrete his invention and prevent others from making, using or selling it—for only 17 years. After expiration of this period, his invention, all drawings, descriptions, and specifica-

tions, are "public property" since any person may refer to the Patent Office records and learn how to make, use, and sell the invention or any part of it without any assistance or objections of the inventor. The reason for this law is that an inventor cannot renew his patent. Once it has expired it is public property.

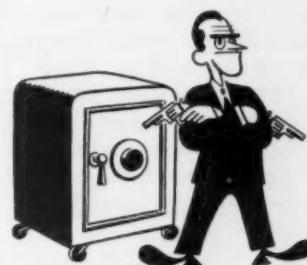
Brief Review

Patents may be said to be subdivided into classes of Machines or Improvements, Articles of Manufacture, Compositions of Matter, Mechanical Processes, Chemical Processes, and Designs. Each of the five first kinds issue for 17 years. A Design patent issues for $3\frac{1}{2}$, 7 or 14 years as the applicant may elect, and relates to the exterior appearance of an article, which *must be* ornamental, attractive, novel, useful, and the result of invention.

Many good inventions have been lost to inventors not securing the protection afforded by the Patent Laws.

The following U. S. Court and Commissioner of Patents excerpts are interesting:

"The man who secretes his invention makes easier and plainer the path of no one. He contributes nothing to the public. The law owes nothing to the inventor who hides away his invention, and to permit him to lie and wait for one who independently and in good faith proceeds to disclose the invention to the public would be against the policy of the patent laws. In the eyes of the law he is not the prior inventor." (App. D. O. 1914) Brown v. Campbell, 201, O. G. 905.



YOU CAN KEEP IT A SECRET

It is the settled doctrine of the higher courts that when an inventor perfects and reduces to practice an invention, and fails for an unreasonable period to take steps to give it to the public, and until someone else has independently invented and patented it, the earlier inventor forfeits his rights to a patent against the later inventor. See Mower v. Crisp, 83, O. G. 155. Mason v. Hopburn, 84, O. G. 147. Davis v. Forsyth, 87, O. G. 516. Mower v. Duell, Commissioner 88, O. G. 191. Thomson v. Weston, 94, O. G. 985. Wright v. Lorenz, 101, O. G. 664. McDonald v. Edison, 105, O. G. 973. The same rule has often been laid down by the other courts. See Robinson on Patents, P839. See also: Berg v. Thistle, Fed. Cas. No. 1,337; Curtain Supply Company v. National Lock Washer Company, 174 Fed. Rep. 47.

Another important point of law is: An inventor who is the first to conceive but the last to reduce to practice is entitled to be considered the real patentee where he has followed up his conception by due diligence. See Cooke v. Jones and Taylor, 116 O. G. 1181.

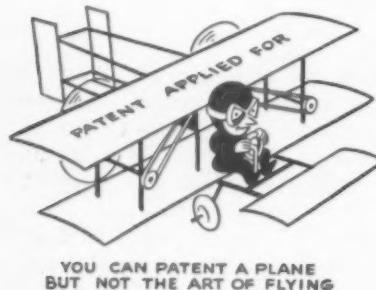
Still another important point is: An inventor is entitled to a reasonable time to perfect his invention before applying for a patent, and what is a reasonable time depends upon the particular circumstances. See Mead v. Davis and Varney, 36, O. G. 2001. The reason for this law is that the courts realize that

very frequently inventors spend considerable money in experimenting and trying to perfect an invention, before they can profitably file an application for a patent.

Ideas and Practice

All higher courts agree that the inventor who has a legal right to the patent is the person who was first to have the idea and the first to cause the invention to operate.

For example, the Wright Brothers had the idea of a "flying machine". They built an airplane and demonstrated that their idea was practical. However, they were *not* granted a patent which prevented all other persons from flying. The patent broadly protected *mechanical* means, important parts of which were the stationary wings, and power to propel the device. In other words, their idea of flying was put into practical usage.



In *Atchison v. Peterson*, 87 U.S. 507, the Supreme Court of the United States said:

"An idea of itself is not patentable, but a new device by which it may be made practically useful is."

If Wright Brothers had been the first to put their idea on paper, and another had been first to make a model and put the idea into practical usage, this person and not Wright Brothers could have had the basic patent on a "flying machine".

Now, the question will immediately arise in the reader's mind: If that is so, what can an inventor do to protect his idea and invention without immediately applying for a patent?

The answer is: If the inventor does not intend to immediately file an application for a patent he should do everything possible to later prove to a court (1) the exact date he began experimenting on the invention; (2) the exact date he perfected the invention; and (3) the exact date he reduced the in-

vention to practice, that is, made and demonstrated the first model of the invention.

In other words, modern courts do not require an inventor to hurry an application through the Patent Office for an invention not fully perfected. However, the inventor should in all instances keep written records of all experiments and have these records witnessed and dated. Also, he should especially keep models and full data and evidence on which he can rely to prove to the court the dates he first conceived and perfected various parts or improvements of his invention. *This is important:* An inventor who proves that he was first to conceive an invention, first to perfect it, and first to make a workable or operative model of the invention, *always* may obtain the patent providing he does not delay more than a year or so to file the application for a patent. The inventor who proves that he was the first to conceive and the first to perfect an invention is *not* entitled to a patent against another inventor who was the last to conceive but the first to make an operative model of the invention. Thus again we observe that the courts are in favor of the inventor who first imparts knowledge of his invention to the public.

Proving Priority

In view of these established facts of law it is now practical to state advice to inventors, who want protection on their ideas without immediately filing an application for a patent, as follows: First, purchase a book with fixed leaves or sheets; make written notes and full explanations of *every experiment* and the results, with dates, on these various sheets, and with witnesses if possible. Witnesses will be helpful in event of future litigation, but not necessary. In other words, occasionally it will be advisable to permit a dependable person to witness an experiment, and his name and address should be written on the dated sheet on which the experiment is explained, and his name signed thereto when the invention is perfected and operative. The inventor may then file an application for a patent, or if he prefers not to file the application he must build an operative invention and *have two or more persons witness* its successful operation. The date of the operation with full explanations, names and addresses of the witnesses, and their names signed

thereto should be listed in the above mentioned book.

The object of this procedure is this: The higher courts hold that reduction to practice of an invention is equal practically to filing an application for a patent. The legal difference is that the instant an inventor files an application for a patent, the Patent Office issues a *dated* receipt. Thus the inventor has positive proof as to when he filed the application for a patent. However, in order to prove the date of "reduction to practice" of an invention, the inventor must introduce witnesses to testify that they *saw* the demonstration, *observed* the device in operation, and *remember* the date of "reduction to practice" of the invention.



It is not good logic for an inventor to rely upon proof of experimentations to induce a court to award a patent to one who failed to file an application until long after another filed his application for the same invention. Yet, it is well to know that several higher court cases are on record which awarded patents to inventors who delayed several years in filing their applications for patents. In one case, for example, an inventor delayed seven years in filing an application for a patent on a road resurfacing material, while using it on highways. The court held that he could receive the patent although another inventor filed his application for the same invention three years previously.

Who Owns Patent?

Very frequently inventors became involved in litigation with their employers over ownership of a patent. In fact considerable discussion has arisen from time to time over the legal question: If a company's employee obtains a valuable patent, who owns the patent? The answer is: The employee owns it, unless the employer proves that the employee (1) was hired to ex-

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periment and devise new inventions; (2) or the employee perfected the invention during the time he was being paid by the employer.

For example, in E. F. Drew & Company, Inc. v. Reinhard, 74 F. Supp. 574, the testimony showed facts, as follows: One Reinhard entered the employ of a manufacturer of chemical products. As part of his duty he had "the development of new products, intended for sale to potential customers, and to develop processes for treatment of various substances including water and other liquids". Actually Reinhard acted as general manager and his duties were primarily sales

showed that the employee was *hired to experiment* and also he had signed a contract whereby he bound himself to "assign to this company all property rights in any inventions" connected with the work of the company.

Don't Waste Opportunity

A patent may be so weak or narrow that a slight alteration of the invention will enable a competitor to make and sell a similar device. This is so where the invention is on an important improvement of an old invention, as a process, composition, machine, or article of manufacture. If the patent contains basic claims, the inventor may without any trouble or expense prevent other persons and firms making, selling or using an invention even remotely similar.

It must be remembered that a patentee is bound by his claims and he cannot ask for a broader construction by the court even though he was entitled to broader and stronger claims when the patent application was filed carelessly or incorrectly by the Patent Lawyer. In other words, the court will expand a claim in favor of a patentee, but he will be protected only and exclusively by the terms of his claims. Also, the courts hold that specifications cannot be "claims". A claim is a definition of the invention and is the inventor's sole protection.

Another important point of law is that no inventor can obtain a valid patent unless his invention is new in the whole world. Hence, if a competitor discovers that your invention was used, or published in a magazine or other publication, in any country in the world before you perfected and patented it, your patent is worthless.

Infringement of Patent

A patent is a form of monopoly. This monopoly has been recognized by all courts. See the early case of Wilson v. Rousseau, 4 Howard 646. Here the court decided that a patentee has the exclusive right to make, sell and use his invention for the term of years specified in the patent grant. And in Cantelo, 12 Pat. Law R. 262, the court said:

"The patentee has the sole right of making, using, and selling the articles, and he may prevent anybody from dealing with them at all. Inasmuch as he has the right to prevent people from using them, or dealing in them at all, he has

the right to do the lesser thing, that is to say, to impose his own conditions. It does not matter how unreasonable or how absurd the conditions are."

It is important to know that a most common source of patent litigation is contributory infringement, or an indirect infringement usually surrounded by obscurity.

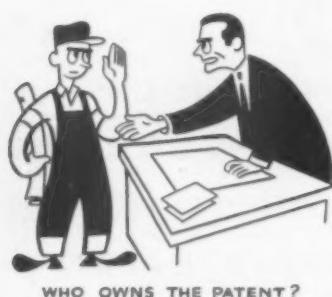
In the recent case of General v. Sutter, 186 F. 637, a higher court in the United States defined the term "contributory infringement":

"The legal principles governing contributory infringement exist where one knowingly concert or acts with another in an unlawful invasion of a patentee's rights."

Hence contributory infringement consists of any act or series of acts which results in infringement.

Infringement Liability

According to a recent higher court, one who infringes a valid patent is liable for the profits lost by the inventor, plus all damages sustained by the inventor. Also, if the infringement is willful the infringer may be held liable for additional punitive damages.



work, writing of technical literature, advertising matter, drawing up of forms, establishing methods of analysis and control of boiler water, the handling of salesmen's reports, the management of the office staff, watching expenses, costs, etc., etc. During the employment Reinhard made a valuable invention. The question was presented the court as to who owned the patent, Reinhard or the employer?

The higher court held that Reinhard was legal owner of the patent because the employer failed to prove that Reinhard had perfected the invention on the employer's time. The court said:

"One employed to make an invention, who succeeds, during his term of service, in accomplishing that task is bound to assign to his employer any patent obtained. The reason is that he has only produced that which he was employed to invent. . . It is quite clear that he (Reinhard) was not employed to develop an invention, nor did he agree to assign any invention that he might make during the period of his employment."

For comparison, see American Cyanamid Company v. Hubbell, 3 Cir., 76 F. (2d) 807. Here the higher court held that an employee must assign his invention to his employer because the testimony



Recently a higher court held that all acts of the infringement of a patent must be accomplished in the United States. However, if a single part, or the complete patented invention, are shipped from a foreign country and used here, the user is liable as an infringer, although the foreign maker may not be liable. This is true because an unauthorized user of a patented device is equally as liable as the maker or seller who is located in the United States.

Still another interesting phase of the law is that where several persons conspire to avoid paying royalties to a patentee for the use of his invention, and each person performs a distinctly separate act from the others, all of the persons are liable if the concerted acts actually result in infringement.



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within the cylinder to become clogged or inoperative. Discharge hose and nozzle remain empty until extinguisher is actuated. Underwriters' Laboratories rating is B-1, C-1. The dry chemical used is non-conducting, non-corrosive, non-freezing and non-toxic, and is effective on flammable liquid and electrical fires. Extinguishers can be recharged on the spot, without special tools. *C-O-Two Fire Equipment Co., P.O. Box 390, Newark 1, N.J.*

ELECTRICAL INSULATING FILM



SCOTCH-WELD electrical insulating film No. 70 for coils is applied like tape and then heat-treated. It bonds itself into a unified layer of insulation. The cured film has high dielectric strength and good resistance to heat, moisture, oil and most solvents. It is used without other materials in most cases. The tape is made entirely of synthetic resins, with no plasticizers or fillers. It is provided in 60-yard rolls like tape, in widths up to 40", and in thicknesses of 2.4, 6 and 8 mils. It is not sticky to the touch. The film is cured by heat treating 1-2 hours at temperatures usually between 200 and 300F. *Minnesota Mining and Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.*

POLYETHYLENE LINED PAPER BAGS

or three outer walls of kraft paper, and with the liner either inserted loosely or sewn into the bottom seam of the kraft walls. The bags are useful in packing fresh foods, powdered food mixes requiring moisture protection, and oily substances. The liners are made from seamless tubes, either flat or with gussets, which vary in width from 2" to 54" to cover a large variety of bag sizes. Bottoms are formed by heat sealing. Top closures may be either heat sealed or folded, gathered and tied. *Bemis Bro. Bag Co., St. Louis 2, Mo.*

NEW STAINLESS STEEL

ARMCO 17-4PH stainless steel is said to have high hardness and strength, excellent corrosion resistance, good fabricating characteristics, and to require only a low temperature (850 to 1000F) hardening treatment. It is recommended for gears, cams, shafting, chains, valves, and pump parts in equipment where high mechanical properties and corrosion resistance better than can be obtained with present hardenable grades are necessary. Low-temperature heat treatment eliminates problems such as quenching cracks, distortion, internal stresses and objectionable scaling. *Armco Steel Corp., Middletown, O.*

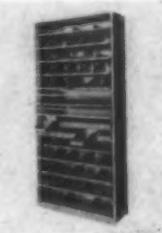
OIL AND GREASE ABSORBENT FOR FLOORS

gasoline, etc. from floors of industrial plants, garages, etc. It absorbs and picks up spillings in excess of its own weight. The material is non-inflammable, and even when saturated with oil will not support combustion. Chemically inert, it is unaffected by acids and alkalis. Packaged in 50 lb. bags. *Pennsylvania Refining Company, 2586 Lisbon Road, Cleveland 4, O.*

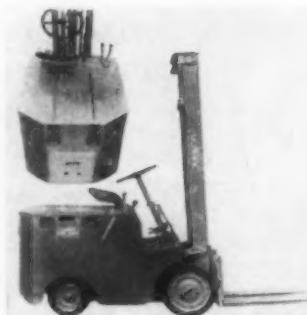
PAPER bags, lined with polyethylene, for products requiring moisture protection, are available with either one, two

VERSATILE STORAGE BIN

FLEXI-BIN is a versatile storage bin to fit the needs of most parts storage situations. It is assembled without use of nuts or bolts. One unit is based upon an assembly of back, sides, top and bottom, measuring 36" x 84" x 12". Shelves slide in place on 1½" centers; sloping shelf dividers in four heights snap into place at desired widths; sloping front trays are available to assemble 4, 6 or 9 to a shelf, and dividers for trays slide into place on 2" centers. Label holders snap on front of shelves and trays. All-welded steel unit has a baked enamel finish, available in five colors. *Burroughs Mfg. Co., Kalamazoo, Mich.*



SHORT-TURN FORK TRUCKS



INCREASED maneuverability and faster handling of materials in confined storage areas are features of the special short-turn models of the electric battery-powered Clipper, Carloader and Utilitrac fork trucks. These models are of 2000, 4000 and 7000-lb. capacity, respectively. Redesign of battery compartments and counterweights to provide angled corners has reduced the turning radii by 6½" on the 2000-lb. truck, 6¼" on the 4000-lb., and 6" on the 7000-lb. *Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

(Please turn to page 152)

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Di Sodium—Cheese, leather, textiles, detergents, water treatment, dye, pigments.

Tri Sodium—Water softener, detergent, metal cleaner, water treatment, textiles.

Tetra Sodium Pyro—Soap, detergents, cheese, textile dyeing, bleaching and finishing, metal cleaning, oil-drilling mud, water treatment, water softener, glass, degreasing.

Tri Poly—Soap, detergents, water softeners, textile dyeing, bleaching and finishing, clay refining.

Acid Sodium Pyro—Baking powder, oil-drilling mud, electroplating.

CALCIUM PHOSPHATES

Mono Calcium—Baking powder, self-rising flour, prepared flour, mineral supplement.

Di Calcium—Tooth paste, tooth powder, mineral supplement, pharmaceutical.

Calcium Pyro—Mineral supplement, pharmaceutical.

Tri Calcium—Tooth paste, tooth powder, anti-caking agent, mineral supplement, pharmaceutical.

AMMONIUM PHOSPHATES

Mono Ammonium—Fireproofing, yeast, malt, plant nutrient.

Di Ammonium—Fireproofing, yeast, plant nutrient.

POTASSIUM PHOSPHATES

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Di Potassium—Fermentation, nutrient solutions, pharmaceuticals.

Tri Potassium—Oil refining.

Tetra Potassium—Soap, textiles, water softener.

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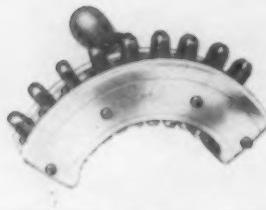
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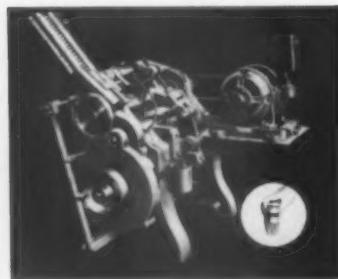


"LUMINUM-LINE" periphery marker for stamping outer circumferences of pipe, tubing, axles, large shafts and other rounded products is cast in one piece from alloy aluminum. The holder is fitted with floating springs for retaining stamps, and channel beading around stamp slots prevents off-angle hammer blows. Standard letter and figure stamps can be used on many applications. Furnished with one or two rows of stamps. *M. E. Cunningham Co., 154 E. Carson St., Pittsburgh, Pa.*

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lights, numbering device, and adjustable background, turns out up to 400 pictures per hour on 35 mm. film. Negatives, which are 1" x 1 3/8", may be printed by contact on all-photographic passcards, made into prints for tamper-proof badges and personnel records, or enlarged for other purposes. No photographic skill is required for operation. Focus, lighting and exposure are standardized. Unit mounted on rubber casters for easy movement. Can also be used for making copies of correspondence, drawings, records, etc. *Industrial Division, Graflex, Inc., Rochester 8, N. Y.*

THREADING & TRIMMING UNIT



NO. 302 threading and trimming machine can also be utilized for beading, knurling and curling, either as separate operations, or in combination. Can illustrated was placed in chute, fed automatically to the chuck, threaded, and automatically ejected at the rate of 35 per minute. By interchange of chucks, cover can be handled in same manner. The machine can handle products made of material up to 3/32" thick. The machine is 4 1/2' by 5 1/2' by 6 1/2'. Powered by a 2 hp, 900 rpm motor using a V-belt drive. *The V & O Press Co., Div. of Rockwell Mfg. Co., Hudson, N. Y.*

NEW LUBRICATED PLUG VALVE

indical plug of the valve has a wedge action which not only adjusts itself for wear, but also keeps the sealing surfaces of the plug and body in intimate contact at all times to provide an extra tight seal against leakage, and lower lubricant losses. Line fluid pressure also acts on the plug to promote the sealing effect. Other features are: port areas equal to the area of standard pipe; a complete lubricant seal around the ports; and positive visible stops to limit operation to a quarter-turn. *Homestead Valve Mfg. Co., Coraopolis, Pa.*

INDICATING SNAP GAGE



ALL-PURPOSE indicating snap gage features a dial indicator that warns the machine tool operator in time for him to reset the machine or tool, by giving fast, positive information on the dimension of the work. The gage can be handled in the same manner as a "Go, No-go" gage. All size adjustments can be made with a screw driver. The gage has cushioned movement and can be faced in any position for machine or bench use. Five sizes cover all dimensions from 0" to 6". *Federal Products Corp., 1144 Eddy St., Providence 1, R. I.*

NEW PALMETTO SHEET PACKING

#2915. It is said to have particular resistance to alcohol-water mixtures, and ethylene glycol water mixtures which tend to swell ordinary sheet packing and thus destroy its tensile strength. The packing is also highly resistant to such refrigerants as freon. Developed with reference to performance requirements of Army-Navy Aeronautical Specification AN-G-171, it is available in standard thicknesses of 1/64", 1/32", 1/16", and 1/8"; in sheet sizes 42" x 60", 60" x 63", and 60" x 126". *Greene, Tweed & Co., North Wales, Pa.*

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THESE fluorescent lamps are said to have an average rated life of 7500 hours when the burning cycles average 3 hours or longer and when the lamps are operated on approved equipment. As a result of the improvements incorporated in the lamps, according to the maker, they now offer consumer lamp value nearly triple that previously received for the same price. They cover the complete range of bipin preheat fluorescent lamps from 15 to 85 watts. *Champion Lamp Works, Lynn, Mass.*

DRY CHARGED BATTERY SPOTLIGHT

RECHARGEABLE
4-volt 2-cell spotlight has pre-charged plates and is ready to operate as soon as the solution is poured in. Pouring solution requires about 30 seconds for each cell. The spotlight is supplied with two small polythene unbreakable containers, each holding approximately 3 3/4 oz. of solution, and with the container caps threaded so they screw easily into the filler plug holes of each cell. Battery casing is moulded of new composition called Butalite, said to have a rated impact resistance comparable to stainless steel. Total weight of spotlight is 5 3/4 lbs. Light output is rated at 25,000 candlepower, which provides a half mile beam during a minimum of 1000 hours operation. *Koehler Mfg. Co., Marlboro, Mass.*

ADJUSTABLE WRENCHES



CARBON steel adjustable wrenches, said to be thinner and lighter than conventional types of similar capacity, have tapered jaws and possess unusual strength and toughness. They are made in 4", 6", 8", 10", 12", 15" and 18" sizes with maximum capacities from 1/2" to 2-1/16". They are drop-forged from selected steel and accurately heat-treated for uniform, dependable strength. Patented sliding jaw feature provides maximum and positive bearing against working stress. Literature available. *J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y.*

(Please turn to page 154)



Freedom begins at home

IN America we take Freedom for granted. It is hard for us to understand why anybody would willingly give up his freedom, to live under a rule that dictates every move of his life.

Yet we must face the sobering fact that right here at home there are plenty of people who are working to curtail, and eventually to abolish personal

freedom, and substitute rigid central controls over our activities. Too often these misguided groups and individuals work harder at their self-appointed tasks than do we who think we prefer freedom.

We as business men, above all others, perhaps, have a responsibility in this matter which we can ignore only at the peril of our own survival.

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5709

"GEARED" HOSE CLAMPS



"EAGLE" hose clamp employs a hinge principle for quick initial engagement and a gear-type screw for fast take-up after the clamp is in place. The clamp may be installed either before or after assembly of the hose connection. These features are said to result in time savings both in production line installations and in repair or replacement use. The clamp may be used on any compressible material, and is available in 5 sizes to cover hose I.D. range of $\frac{3}{8}$ " through $3\frac{1}{4}$ ". Literature available. *The Actus Corp., Mount Vernon, N. Y.*

EXPLOSION-PROOF INTERCOM SYSTEM

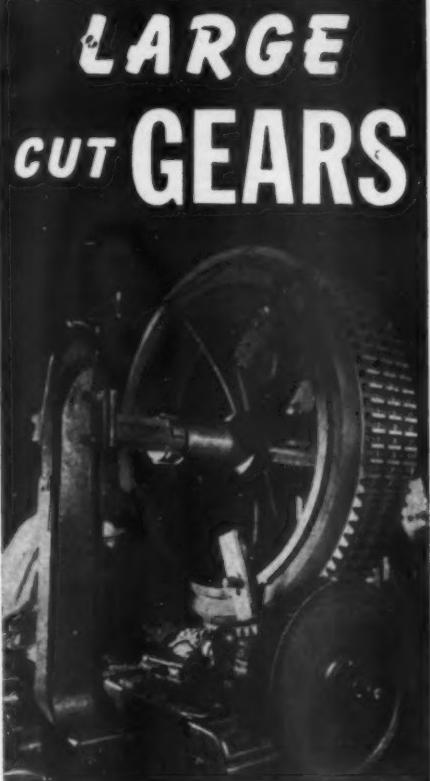
NEW intercommunication system has Underwriters' Laboratories approval for Class I, Group D hazardous areas, which includes atmospheres containing gasoline, petroleum, naphtha, benzine, alcohols, acetone, benzol, lacquer, solvent vapors or natural gas. Full selectivity feature permits stations in hazardous areas to call other stations in either hazardous or non-hazardous areas. The person called can answer from any reasonable distance without stopping his work. Any number of stations may be used in the system. *Executone, Inc., 415 Lexington Ave., New York 17, N. Y.*

SMALL LATHE HAS LARGE HOLE THROUGH THE SPINDLE



THIS new 10" swing lathe has a large ($1\frac{3}{8}$ ") hole through the spindle, making it especially suitable for shops that need large collet capacity but are restricted in budgets or floor space. Other features include: large precision roller bearings; a 4-speed (8 spindle speeds) V-belt underneath motor drive; full double-walled, worm feed apron; full quick change gears; full enclosed headstock with hinged cast aluminum cover; and standard operator controls and other standard "big lathe" features. Known as the XL series, the lathe comes with 38" or 44" bed length on a 3-drawer steel bench, or with a pedestal base in bed lengths up to 2". *Sheldon Machine Co., Inc., 4258 N. Knox Ave., Chicago 41, Ill.*

(Please turn to page 156)



Cutting three identical spur gears simultaneously at Simonds Gear.

Cut Gears for Industrial Needs!

For special gears in larger sizes—exact duplicate gears for replacements—for every heavy-duty industrial gear application—look to SIMONDS GEAR where specialty gears for heavy industry have been a custom service for more than 50 years. Within easy shipping distance of many heavy industry plants—with a personalized service designed to meet your most exacting specifications—SIMONDS GEAR provides an unusually prompt and efficient service on even the most unusual gear requirements. Sizes range up to 145" dia. in all popular gear-making materials. Send your inquiry today and get acquainted with SIMONDS GEAR Service.

SPUR GEARS
BEVEL GEARS • MITRE GEARS
WORMS • WORM GEARS
RACKS • PINIONS

Stock carrying distributors for Ramsey Silent Chain Drives and Couplings. V-Belts.

SIMONDS
GEARS
THE
SIMONDS
GEAR & MFG. CO.
LIBERTY at 25TH PITTSBURGH 22, PA.

Big Game Hunter is Wild about...

Frank Luck says, "I needed strong bars for my lion traps... so I got TEXTOLITE."



Lions have little chance of escaping from this tough General Electric Textolite lion trap. Textolite blends with the jungle surroundings... completely camouflages the trap. Lions walk in—never escape.

● Of course this story of Frank Luck and his G-E Textolite lion trap is fictitious, but it does get over an important fact. . . . *General Electric Textolite is versatile.*

If you have an application that requires a non-metallic material with excellent electrical, mechanical, chemical, and thermal properties, it will be to your advantage to investigate Textolite. Reduced costs and product improvement may result.

G-E Textolite offers you a choice. It is produced in many grades—over fifty. And each of these grades has an *individual combination* of properties. None are alike. With this wide selection you can be assured of getting a laminated plastics with the *correct* properties for your application. Plastics Division, Chemical Dept., General Electric Co., Pittsfield, Mass.

G-E LAMINATED TEXTOLITE IS SUPPLIED IN:



LOW-PRESSURE
MOLDED PARTS



MOLDED-LAMINATED
PARTS



FABRICATED
PARTS



SHEETS, TUBES
RODS

G-E TEXTOLITE*
Laminated Plastics

*REG. U. S. PAT. OFF.



SEND FOR THIS HELPFUL BULLETIN TODAY—
IT'S FREE

Write for your copy of "G-E Textolite Laminated Plastics." It lists grades, properties, fabricating instructions, and detailed information about Textolite industrial laminates.

General Electric Company
Chemical Department (10-1)
One Plastic Ave.,
Pittsfield, Mass.

Please send me the new G-E Textolite
laminated plastics bulletin

Name _____

Firm _____

Address _____

City _____ State _____



GENERAL ELECTRIC

CD49-J1

Now! Magnifications as high as **10,000 TO 1***



*with the Merz "Vigilant" New-Matic

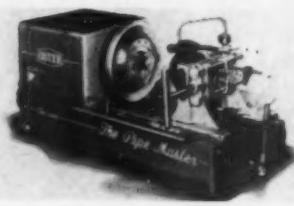
Here, now, is the one and only air-activated unit—totally unaffected by surface variations—with magnifications as high as electronic gages. It's the Merz "Vigilant" New-Matic Measuring Machine, with magnification up to 10,000 to 1, with a range of .0003. Also available with magnification of 5,000 to 1, with a range of .0006. Gives you the highest precision available—for the price of an air gage: Operates on the proved Merz principle of "balanced air." Has the additional advantage of a new adjustment that determines, independently, spread as well as zero positioning. Furnished with Merz' exclusive Sapphire or Diamond button spindle. Conventional jet-type spindle optional. Ask for a demonstration—in your own plant!

MERZ ENGINEERING COMPANY • INDIANAPOLIS, INDIANA



NEW-MATIC MEASURING MACHINES—NEW-TRONIC COMPARATORS AND SORTING MACHINES—
STANDARD A.G.D. AND SPECIAL GAGES—TOOLS—SPECIAL MACHINERY—EXPERIMENTAL PROJECTS

PORTABLE PIPE THREADER

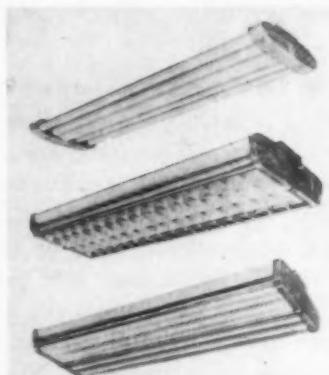


NO. 522 DeLuxe "Pipe Master" threading machine of aluminum construction has a regular pipe range of $\frac{1}{4}$ " to 2" pipe; extra range $\frac{1}{8}$ " pipe; extended range of $2\frac{1}{2}$ " to 8" pipe when used with drive shaft and geared die-stock; and a bolt range of $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Furnished with universal geared head motor and safety switch for operation on 110 volt either a-c single phase or d-c (220 volt optional at no extra cost). Regularly made for bench use but can be supplied on either a steel stand with 16" plain wheels or on a pipe leg stand with tool tray. *Oster Mfg. Co., Cleveland 3, O.*

ALL-PURPOSE TORCH FUEL

BENZRITE is described as a trouble-free torch fuel for all makes of blow torches, firepots, camp stoves, lanterns, weed burners, truck flares, etc. It is non-carbonizing, economical and will increase the life of appliances in which regularly used, manufacturer claims. Available in one-quart cans, packed 12 and 24 to a carton. *Otto Bernz Co., 280 Lyell Ave., Rochester 6, N. Y.*

4-LAMP FLUORESCENT FIXTURES



COMMERCIAL type 4-lamp 40-watt fluorescent lighting fixtures, to match the 2-lamp C-247 series introduced last year, are the unshielded C-447 unit (top), louver-shielded CL-447 unit (center), and plastic-shielded CP-47 unit (bottom). All 3 have matching end caps and trim, so they can be hung in same areas with the 2-lamp fixtures. A 20-gage steel-constructed, aluminum enamel-finished basic chassis and white Miracoated reflector, which provides a minimum reflection factor of 86%, are featured. The entire line is furnished complete with starters, lamp-holders and lamps, and is Underwriters' approved. *Sylvania Electric Products, Inc., 500 Fifth Ave., New York, N. Y.*

(Please turn to page 158)



AUTO-LITE

With greatly increased manufacturing facilities, Auto-Lite is now more than ever before the logical source of high quality industrial wire and cable and wiring assemblies. Any type, size, shape or insulation required by your specifications can be promptly delivered.



THE ELECTRIC AUTO-LITE COMPANY
Port Huron Wire and Cable Division Michigan

WIRE

AND

CABLE

Inquiries invited Catalogs with complete descriptive data will be sent on request. Write on your company letterhead.



TUNE IN "SUSPENSE!" . . . CBS RADIO NETWORK THURSDAYS . . . CBS TELEVISION TUESDAYS

Using the 5-HP GRAVELY Tractor IS LIKE HAVING 8 MORE MEN for SNOW REMOVAL!



Yes . . . industrial and city records prove that one man, with one GRAVELY Tractor and its Snow Plow attachment can move as much snow as eight men by hand—in the same length of time! Think of the saving in man-hours, in maintenance dollars!

The GRAVELY is compact and maneuverable. It is easily handled in those close places—walks, drives, loading areas—where the only other practical way to move the snow is by expensive hand labor.

19 ATTACHMENTS FOR YEAR-ROUND USE

type differential for easy handling, full flow of power. Two speeds forward and REVERSE. Direct Gear Drive to all power attachments—no chains or belts to wear or slip. All attachments quickly changed. All moving parts fully enclosed for long life and trouble-free operation . . . The Gravely is backed by 28 years of proven service. National Sales and Service organizations as near as your phone. Write today for FREE CATALOG, prices and name of nearest dealer.

Snow Removal is only one of the 19 jobs the Gravely can do for you. Change attachments—it takes only a minute—and you do all these other maintenance jobs quicker, easier, better: Power Sweeping, Lawn Mowing, Weed and Tall Grass Mowing, Spraying, Hauling, Light Bulldozing, Landscaping.

The GRAVELY Tractor, though moderately priced, is the world's finest small tractor. Auto-

GRAVELY MOTOR PLOW & CULTIVATOR CO., Box 983, Dunbar, West Virginia

THE POWERFUL 5-HP **GRAVELY TRACTOR** DOES THE JOB RIGHT—WITH POWER TO SPARE!

more than
80
Oakite
Materials
to solve
your cleaning
problems

Plus FREE In-Plant SERVICE

IT'S wise business first to question the kind of service behind the cleaning compounds you propose to standardize on. So if you are planning the purchase of cleaning materials here's the sort of service Oakite offers:

- the free, personal help of over 190 trained technical service men who work out efficient methods for you
- chemical and mechanical laboratories to help solve your cleaning problems
- handy warehouse stocks for prompt delivery
- free technical bulletins, digests, booklets

Want to put this service to work for you today? Just call or write Oakite Products, Inc., 54 Thames St., New York 6, N. Y.

Technical Service Representatives Located in
Principal Cities of United States and Canada

OAKITE
REG. U. S. PAT. OFF.
SPECIALIZED INDUSTRIAL CLEANING
MATERIALS • METHODS • SERVICE



MAGNETIC PIPE & SHAPE ROLLS



NEW type of magnetic pipe and shape rolls, fabricated from powerful permanent non-electric magnets are designed for the "drag out" of pipes and shapes from galvanizing pots. The absence of slip rings and other electrical accessories eliminates necessity of constantly cleaning or replacing these parts. The rolls are able to withstand temperatures up to 800F. Fumes arising from the galvanizing pot and moisture from the steam bath have no effect on the rolls. Erie Mfg. Co., 832 E. 12th St., Erie, Pa.

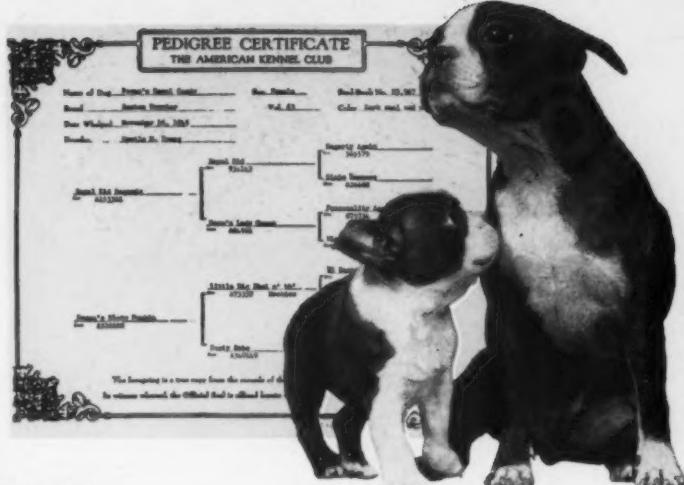
200 AMPERE ARC WELDER



WILSON 200 Ampere Max. MCT a-c transformer arc welding machine is described as an economical, portable unit for use by small shops, garages, and maintenance crews. Welding range is divided into 2 ranges of current adjustment with stepless control throughout each range. Capacitors are supplied in the secondary circuit to provide easy arc starting and arc stability. Built-in capacitors in the primary circuit provide power factor correction. Primary "on and off" switch and a 10' length of 3-conductor rubber covered primary cable with lugs attached are included with the machine. Air Reduction, 60 E. 42nd St., New York 17, N. Y.

(Please turn to page 160)

The Boston Terrier was bred in Boston about sixty years ago from English Bulldog and white English Terrier stock. This little fellow is exceptionally lively and bright, and truly deserves the title of "American Gentleman."



When You Buy Boxes

Look First for the Pedigree

MAKERS of famous brand-name products cannot afford to gamble on corrugated containers. They must have a box that will carry their product safely from factory to dealers' shelves all over America.

That is why Stokely-Van Camp pack Stokely's Finest canned vegetables, dinner table favorites of millions, in Union boxes—the boxes with a pedigree.

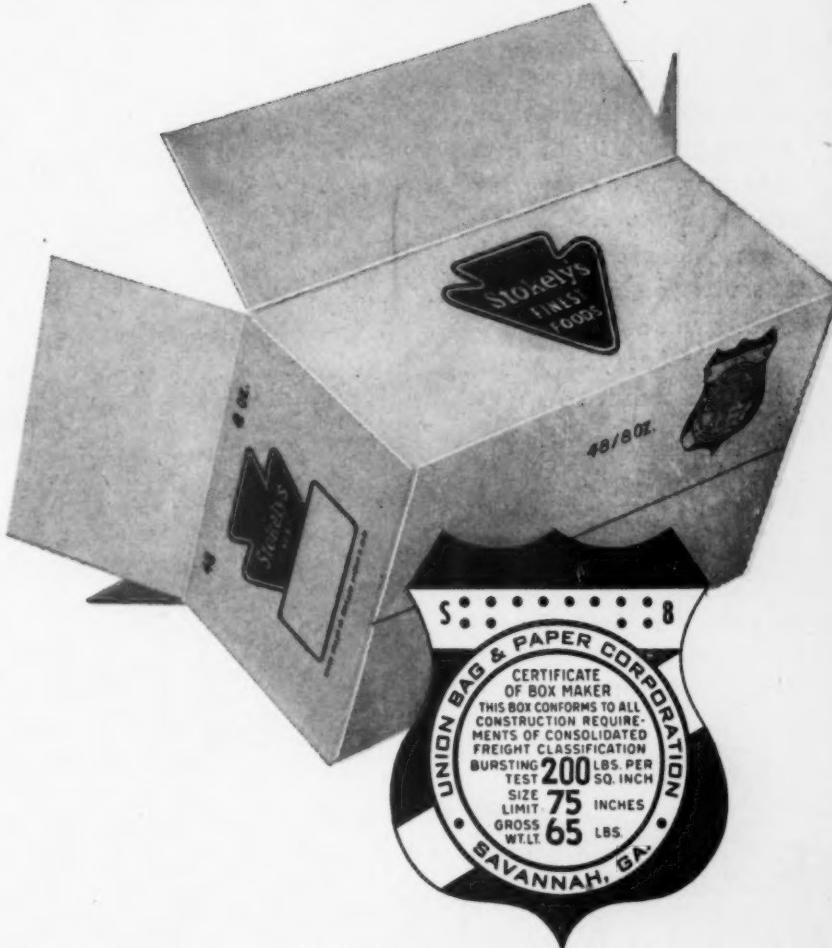
75 years of leadership in kraft packaging stands behind Union boxes. Every step in the making, from timber to finished box, is quality-controlled by one management in America's largest pulp-to-container plant.

Vast forest resources, four of the most modern corrugating plants, and five of the nine largest paper machines in the world are your assurance of consistent quality, dependable service and fair price, today and in the future.

That's why, every month, more famous national-brand products are shipped in Union boxes.



Dependable Packaging
Since 1872



UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N.Y.

Corrugated Container Plants: SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY

For—

- ✓ **Top quality rivets**
- ✓ **Service you'll like**

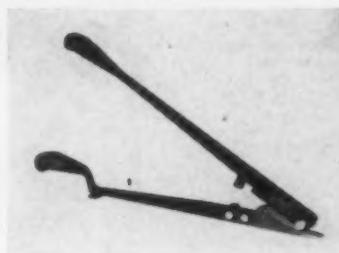
It's a difficult thing to put into words . . . but easy to prove. Next time you need tubular or split rivets, "buy American," as so many leading manufacturers do. See if you don't find us the kind of source you like — ready, willing and able to supply exactly what you want, when you want it.

Tubular and Split Rivets . . . of all metals . . . for all industrial applications.



AMERICAN RIVET COMPANY
(An Illinois Corporation)
1313 W. Congress St., Chicago 7, Ill.

HEAVY DUTY STRAP CUTTER

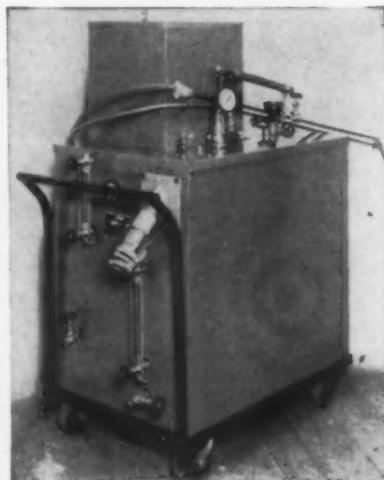


THIS heavy duty tool is for cutting $\frac{3}{4}$ ", $1\frac{1}{4}$ " .035 and $1\frac{1}{4}$ " and 2" .050 high tensile steel strapping. It is described as a sturdy tool with specially designed flat lower jaw which allows operator to cut strap with utmost speed. *The Brainard Steel Company, Warren, O.*

IMMERSING BASKET

HEAVY duty immersing basket is fabricated of Cor-Ten, high tensile corrosion resisting steel, and has a positive resistance to acid pickling solutions. The basket is compact, can be transported either by crane or fork lift truck, and is constructed for long, continuous service. It is supplied in any size to meet varying specifications. *Phillips Mine and Mill Supply Co., 2227 Jane Street, Pittsburgh 3, Pa.*

STEAM-JET CLEANER

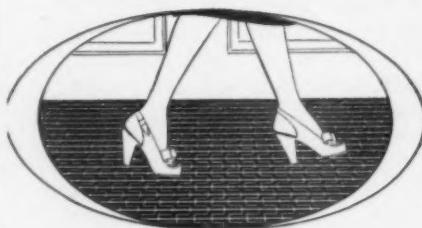


MODEL JC-30 steam-jet cleaner is described as a portable, automatic, maintenance-free and powerfully effective steam-detergent cleaning unit that can be operated safely and silently during regular working hours without annoyance to personnel or damage to nearby machinery, parts or materials. The unit uses high pressure steam from a built-in boiler, and there is no excess water to dilute the detergent or flood the working area. The high velocity jet reaches places inaccessible to scrub brush cleaning. Floor space required is 27" x 40". Operates on a-c current, 220 volts and over, single or polyphase. *Livingstone Engineering Co., 100 Grove St., Worcester, Mass.*

(Please turn to page 162)

AJAX FLEXIBLE COUPLINGS
For standard equipment and replacement on
Direct-Connected Machines
AJAX FLEXIBLE COUPLING CO., Inc.
13 English St.
WESTFIELD, NEW YORK

THE SAFE OPEN STEEL FLOORING IS TRI-LOK



No object over $\frac{1}{2}$ square inch can pass through super-safe U-Type Tri-Lok Flooring. Fabricated without bolts, rivets or welds, it is unsurpassed for plant installation, walkways, loading platforms. Efficient distribution of concentrated loads . . . maximum free opening for light and air. Write for Bulletin JV-1140.

DRAVO CORPORATION

National Distributor for the
Tri-Lok Company
Dravo Bldg., Pittsburgh 22, Pa.
Sales Representatives in
Principal Cities



MESTA

Forgings

From the selection of raw materials to the accurately machined finished product, every step in the manufacture of Mesta forgings is under rigid control to assure consistent high quality. Mesta Forge Shops produce carbon and alloy steel forgings in all sizes, up to the largest used by industry.

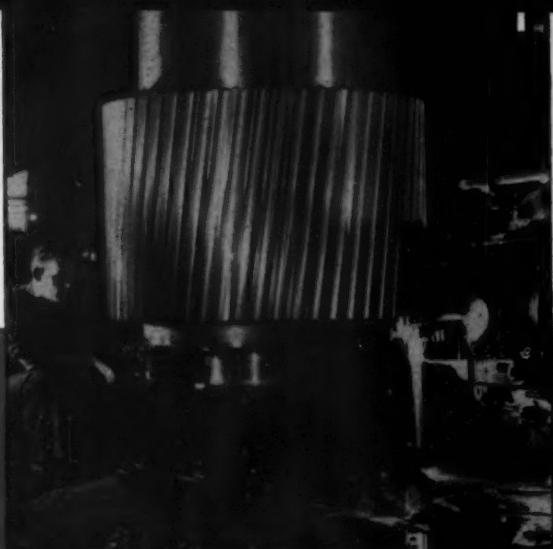
*Write for descriptive
forging literature.*



3



4



2



- 1 Forged steel single helical cut tooth pinion for vertical edging aluminum rolling mill.
- 2 Group of forged steel coupling halves.
- 3 Group of semifinished forged steel spindles for four-high continuous strip mill.
- 4 Forged steel gears for four-high skin pass mill feed reel.

MESTA
MACHINE CO.
PITTSBURGH, PA.

**ACME
SILVERSTITCHER
cuts the cost of
carton assembly
and closure**



Stitches are formed in one operation from a continuous-length coil of Acme Silverstitch wire.

Carton bottoms are stitched neatly and securely on this Acme Post-Type Silverstitcher.

**How tile manufacturer
cut labor costs in half!**

By stitching the bottoms of corrugated cartons instead of hand gluing them, one operator working full time on one shift can turn out 1,500 cartons per day for west coast tile manufacturer. Under the old method, two shifts of operators were required for the same production.

Not only is the new carton neater and stronger, but considerable space (which was at a premium) has been saved by the change in methods.

This is typical of the savings that can be effected by using Acme Silverstitchers and Silverstitch wire. Find out what they can do for your packaging operation . . . at no obligation! Write direct about your specific problem, or mail the coupon below.

**STITCHING WIRE DIVISION
ACME STEEL COMPANY**

NEW YORK 17

ATLANTA

CHICAGO 8

LOS ANGELES 11

ACME STEEL COMPANY, Dept. P-99
2838 Archer Avenue, Chicago 8, Illinois

- Send free booklet, "Profit by Stitching."
 Have representative call.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

COMPACT STEAM CLEANER

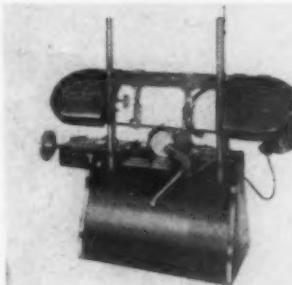


MODEL Q steam cleaner measures only 44" wide, 24" deep, and 45" high. Featuring high output (110 gals. of solution vaporized per hour), the cleaner also has automatic type pump, all-steel welded construction, automatic fuel regulator, automatic safety shut-off, high velocity nozzle, and aerated gun grips. No special skills are required to operate, maker claims. Also available in portable models. Kelite Products, Inc., Box 2917, Terminal Annex, Los Angeles 54, Calif.

NITROGEN DIOXIDE DETECTOR

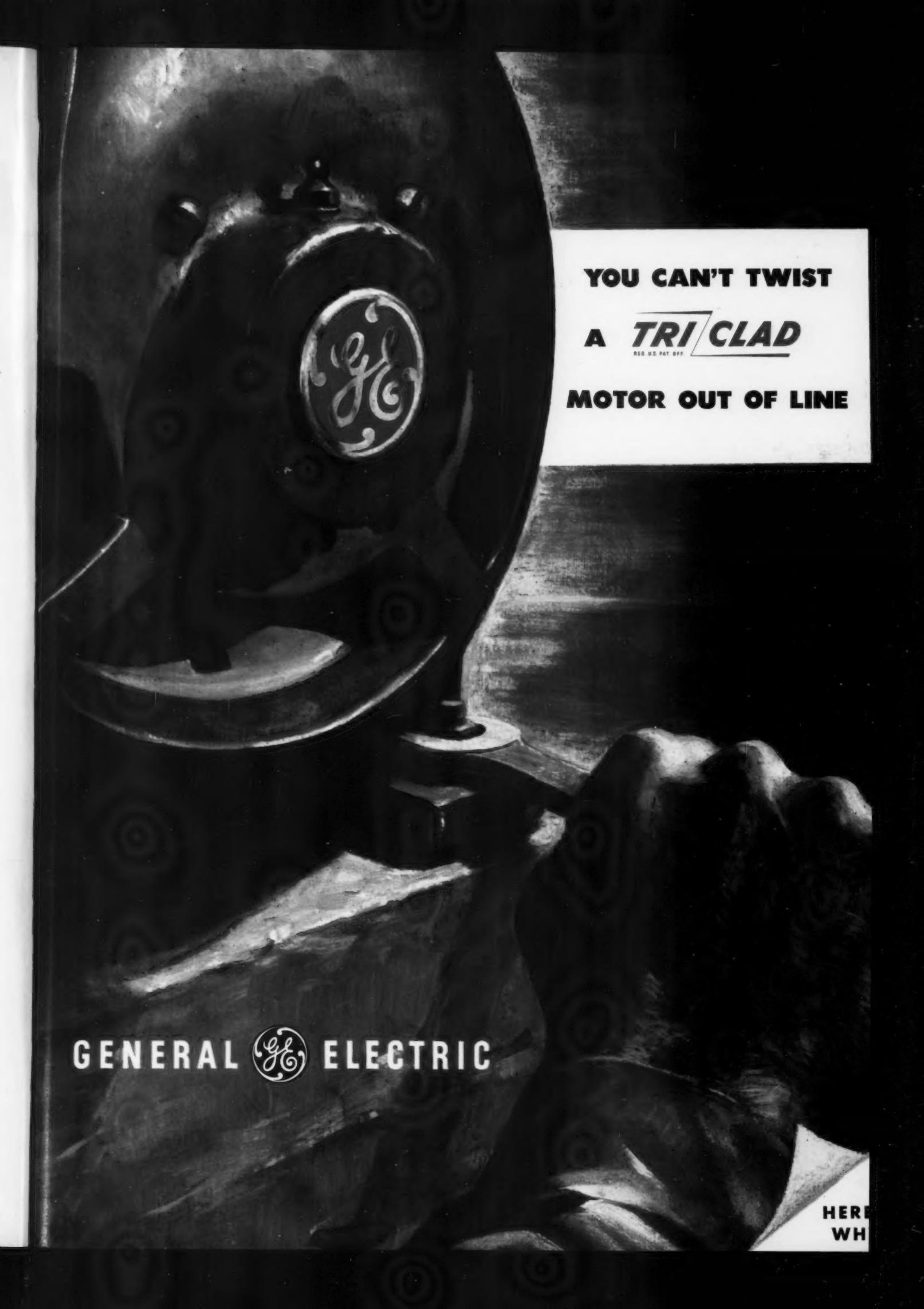
RAPID, on-the-job determinations of nitrogen dioxide concentrations from 1 to 500 ppm in industrial atmospheres are possible with this new, portable detector. The entire unit consists of a compact, sturdy field kit containing reagent bottles, sampling syringes, color plaques and directions. Solutions of sulfanilic acid and alphanaphthylamine to be used later in sampling are prepared in the laboratory, and become the reagents of the detector unit. Bulletin available. Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

METAL CUTTING BAND SAW



MODEL "M" 9" metal cutting band saw can be used for a variety of milling and planing operations, such as slotting, removing corners of die blocks, etc. Many hand operations have been eliminated to decrease fatigue. The machine raises and lowers hydraulically. It has a capacity of 9" x 18", maximum clearance under saw blade of 20", and swivel vise 45 degrees in either direction. Blade length is 11' 5 3/4" x .032". Floor space is 20 1/2" x 66". All rotating parts operate on ball bearings. Columns are placed at each end of the machine for maximum rigidity. W. F. Wells and Sons, Three Rivers, Mich.

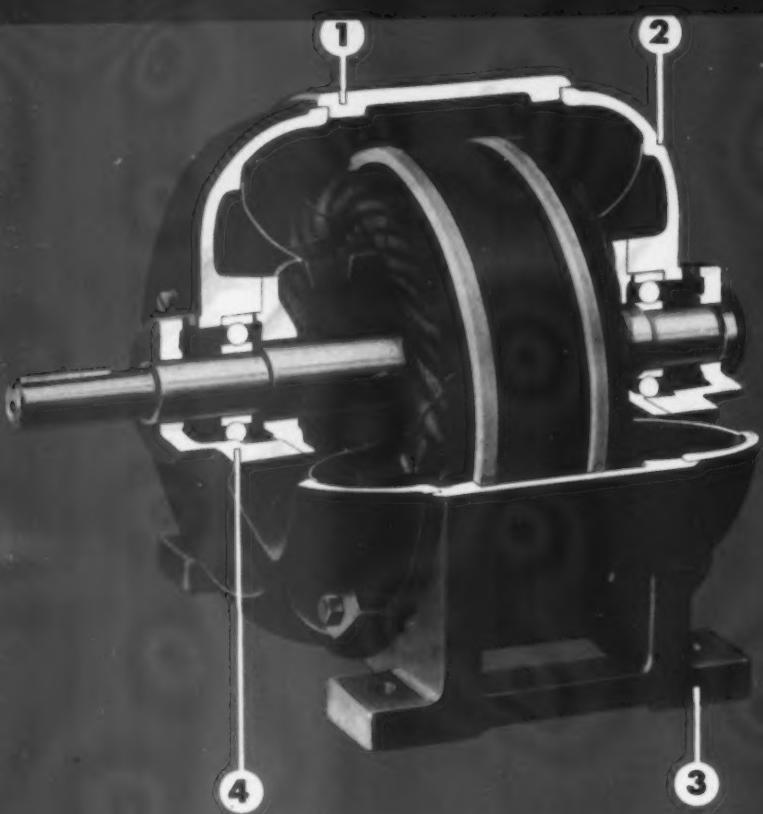
(Please turn to page 166)



**YOU CAN'T TWIST
A TRI/CLAD
MOTOR OUT OF LINE**

GENERAL  ELECTRIC

HERE
WH



Look at the solidity of a Tri-Clad's thick-section cast-iron frame (1) and heavily reinforced end shields (2) . . . its heavy integrally cast feet (3). Do you wonder we say "Tri-Clad gives you structural strength and rigidity no other general purpose motor can match"? Notice, too, the completely enclosed bearings (4). A Tri-Clad motor will run safely without relubrication for years — as long as any general-purpose motor you can buy. Yet it's grease-gun easy to lubricate if you ever need to.

You can't twist a **TRI CLAD** motor out of line

Try as a heavy-muscled mechanic may, he can't twist a Tri-Clad motor frame when bolting it to an uneven surface. The bolt will snap before he can pull that rigid cast-iron structure out of line.

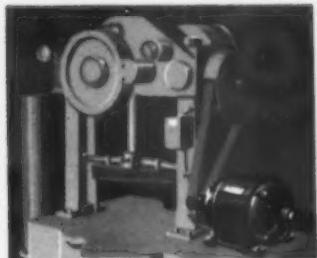
Important? It's one of the basic reasons General Electric believes cast iron to be the ideal structure for general-purpose industrial motors. Other reasons? Cast iron has unusually high resistance to rust and corrosion. It has an inherent damping action that minimizes resonance. And . . . it won't take on an injurious permanent "set" as a result of accidental blows or mechanical abuse.

Want a motor that's been **SERVICE-PROVED** in 5 billion hours of rugged industrial use? Nearly all types and ratings are **AVAILABLE FROM STOCK**.

Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

GENERAL  **ELECTRIC**

YOU CAN'T BEAT
TRI CLAD
REG. U. S. PAT. OFF.
EXTRA PROTECTION



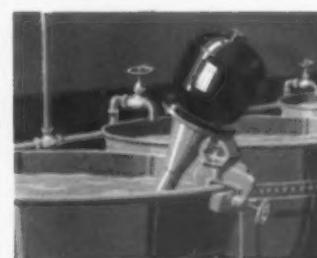
G-E open (driproof) induction motors for constant-load, constant-speed applications. From 1 to 2000 hp.



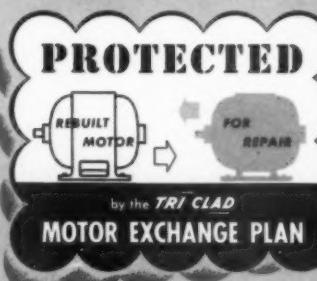
G-E totally enclosed motors for outdoor operation, in abrasive dusts, or corrosive fumes. From 1 to 1000 hp.



G-E Type ACA induction motors for adjustable speeds—provide 3 to 1 speed range. From 3 to 75 hp.



G-E flange and face-type motors for use where the machine supports the motor, or vice versa. From 1/20 to 60 hp.



Look for this EXTRA on the motor you buy!

Stainless

... Presteel produces intricate parts from many metals including STAINLESS STEEL!



Photograph
1/4 actual size



This stainless steel stamping is one of the many components of a modern time recording device. To allow uninterrupted production line assembly and accurate recording by the machine, several vital dimensions of this part must be held to close tolerances. Not only must the individual holes and slots, the lanced and formed fingers be held to specifications, but their relationship one to another must be precisely maintained.

More and more stampings are being made from stainless steel. It has many advantages including improved physical properties and resistance to corrosion.

Based on years of metal working experience and know-how, Presteel has developed new and special techniques demanded by the characteristics of this comparatively new material. Let us put this knowledge to work for you!

Representatives in
ALEXANDRIA, VA.
BUFFALO
CANTON, OHIO
CHICAGO
DENVER
DETROIT
FORT WORTH
INDIANAPOLIS
LOS ANGELES
NEW YORK
PHILADELPHIA
SYRACUSE
TORONTO, CANADA

ALLOY STEELS AND OTHER
METALS COLD FASHIONED
SINCE 1883

WORCESTER PRESSED STEEL CO.

209 BARBER AVENUE
WORCESTER 6, MASS.

THE PROBLEM: Needed
10,000 special crates . . .

THE ANSWER: General
Box Company produced
them in 3 of their plants . . .

but fast!
and fast!



More than 25 years of experience in meeting America's shipping problems!

The 3 best-situated General Box plants cooperated in rushing the production and delivery of this order. Another example of how General Box Company combines its broad and flexible facilities to meet the emergency requirements of its customers.

Whether you need 1,000 or 100,000 containers, you can be sure of quick, efficient service. You can also be sure of a lightweight, compact, extra-strong container that is designed to meet your specific needs.

General
★ ★ ★ ★

BOX COMPANY
... engineered
shipping containers

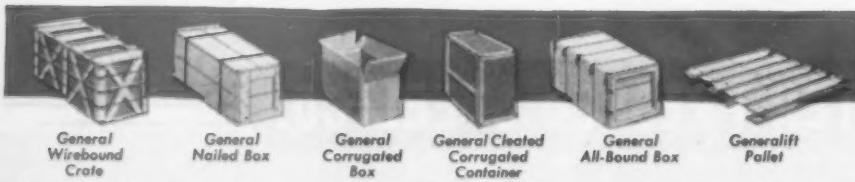
GENERAL OFFICES: 48 West Illinois Street, Chicago 10.
DISTRICT OFFICES AND PLANTS: Brooklyn, Cincinnati,
Detroit, East St. Louis, Kansas City, Louisville, Milwaukee,
New Orleans, Sheboygan, Winchendon, Natchez.

Continental Box Company, Inc.: Houston, Dallas.

Our two Designing and Testing Laboratories are available for the improved packing of your products. They are equipped with the most modern testing apparatus and staffed by experts with many years of experience in designing more efficient shipping containers.



Send for your free copy of
"THE GENERAL BOX"



MAGNETIC PIPE TRAP

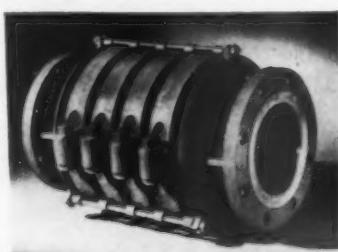


PERMANENT Alnico magnetic trap is for installation in sanitary or standard piping to prevent tramp iron contamination of foods and liquids, and damage to pumps, screens, fillers, etc. The magnet is raised inside the trap body to meet actual material flow. Magnet poles do not contact the liquid. Made in No. 316 stainless steel or Waukesha metal, with standard threads for installation in any sanitary pipe line. Also available in SAE No. 40 bronze with internal threads for industrial applications. Supplied in sizes to fit 1" through 4" lines. Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 14, Wis.

SELECTIVE COATING SYSTEM

CYCLON Series "WPS" selective coating system is for the protection of all types of metal subjected to extreme corrosive conditions, particularly where direct immersion in the corrosive medium is a necessary application factor. The coating is essentially formulated from basic vinyl plastic resins and is unaffected by acids, alkalis, their salts, petroleum products, alcohols, water, etc. Adhesion is secured by chemical inner-reaction of the primer with the metal surface. Completing the system, a tie coat and a final top coat are used. Murray Products, Inc., 12400 Crossburn Ave., Cleveland 11, O.

PACKLESS EXPANSION JOINT



"CORRUFLEX" packless expansion joint is compact enough to permit its use in trenches, tunnels or other cramped quarters. It is made in sizes from 3" to 24", single or multiple corrugation, with or without self-equalizing rings, single or double units, and with either flanged or welding ends. It is supplied in copper, stainless steel, or other alloys, and with internal sleeves if required. The traverse of the joint ranges from fractions of an inch to 15", and will operate under pressures from vacuum to 300 lbs. and temperatures from sub-zero to 1600F. Folder No. R-149 available. American District Steam Co., North Tonawanda, N. Y.

(Please turn to page 168)

There's a difference between stove bolts and stove bolts

To be sure, it's not enough to specify size and style of fastening. The making of a fastening makes a world of difference. And Blake & Johnson has spent 100 years acquiring the skill, the methods, the machinery, the resources and the reputation for making dependable fastenings, precisely to specification. To be sure of getting uniform fastenings that best fit your needs—that mean faster application and longer-lasting assemblies—specify *Blake & Johnson*.

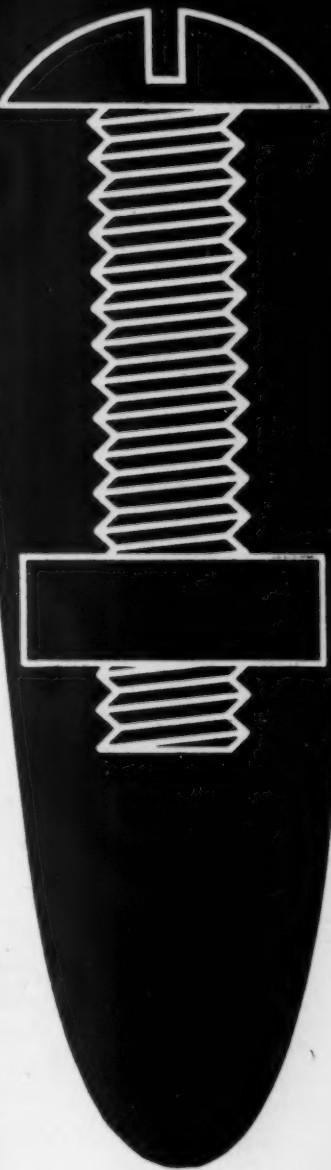
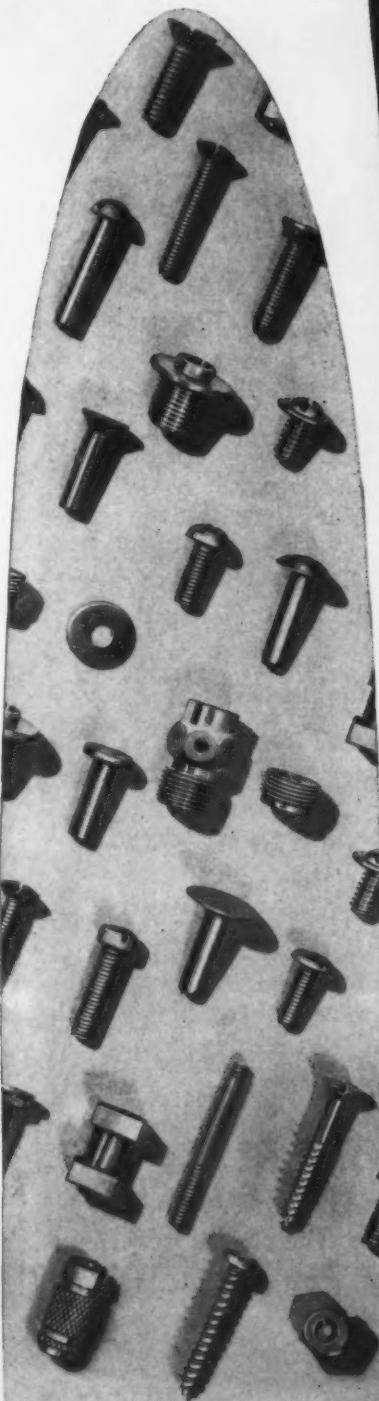
Stove bolts—in special sizes as well as in all standard lengths and diameters—are just one of the items readily supplied from Blake & Johnson's complete line of metal and wood fasteners and parts.

**BLAKE &
JOHNSON**
Fastenings

Slotted or Phillips head machine screws, wood screws, stove bolts, tapping screws, special headed products; nuts, rivets, chaplets, wire forms, screw machine products... in steel, stainless steel, copper, brass, bronze, everdur, nickel, nickel silver, monel, aluminum...

**THE BLAKE & JOHNSON COMPANY
WATERVILLE 48, CONNECTICUT**
1849-1949

A CENTURY OF MANUFACTURING FASTENINGS FOR ALL INDUSTRY



Please send me your new catalog containing full data on the complete line of Blake & Johnson fastenings.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

P-3

HOW CONTINENTAL RUBBER SPECIALISTS

SAVED **12 COST FACTORS**

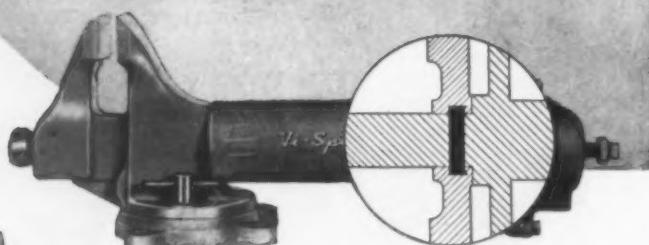
IN THE
VI-SPEED
PNEUMATIC VISE

PROBLEM . . .

To save machine work.
To reduce assembly time.
To improve operating performance in the
Vi-Speed Pneumatic Vise.

SOLUTION . . .

Continental Rubber Engineers developed a molded neoprene packing ring that replaces eight parts, eliminates three machine operations, and simplifies assembly—greatly reducing manufacturing costs. This rubber packing ring also eliminates subsequent "take-up" adjustments and, by reducing friction, increases the operating power and speed of the vise.



Analysis of **YOUR** product may suggest a way to save with a better engineered rubber part. The first step is to write for the Continental booklet "Should Our Rubber Parts Be Made By Specialists". It has been a "thought starter" that has helped others. *Write Today.*



CONTINENTAL RUBBER WORKS

1983 LIBERTY AVENUE • ERIE, PENNSYLVANIA

BRANCHES

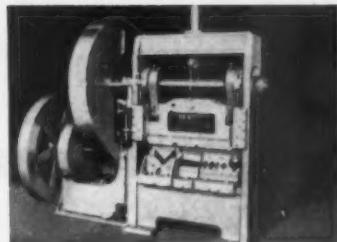
Baltimore, Md.
Boston, Mass.
Buffalo, N.Y.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio

Dayton, Ohio
Detroit, Mich.
Hartford, Conn.
Indianapolis, Ind.
Kansas City, Mo.
Lancaster, S.C.

Los Angeles, Calif.
Lutz, Fla.
Memphis, Tenn.
Milwaukee, Wis.
New York, N.Y.
Philadelphia, Pa.

Pittsburgh, Pa.
Richmond, Va.
Rochester, N.Y.
St. Louis, Mo.
San Francisco, Calif.
Syracuse, N.Y.

GUILLOTINE BAR SHEAR

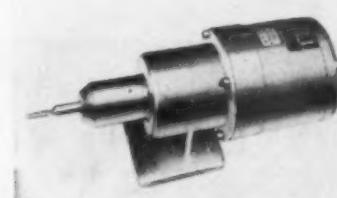


SAVINGS through the elimination of tool changing time on short-run orders of different steel shapes are claimed for this new guillotine bar shear for shearing rounds, angles, bars and squares. It provides a 48" base for mounting tools which include 2 sets of angle shears, 1 shear for handling squares, and shears to handle 3 sizes of round bars. Other tools for other shapes can be supplied. The machine is available in capacities from 50 tons to 450 tons. *Beatty Machine & Mfg. Co., Hammond, Ind.*

POLYETHYLENE FILM

SUITABLE for applications such as food packaging, electrical insulation, rubber interlay, etc., polyethylene is available in flat form in thicknesses from .0015" to .060" in widths up to 60". Tubular film is available in both flat and gusseted in widths up to 54" and in wall thicknesses of .0015" and up. The film features low moisture transmission, resistance to all solvents at room temperature, flexibility at -70F, heat sealability, low specific gravity, and high tear strength. Precision slit rolls are offered wound on accurate cores for use on high speed wrapping and packaging machinery. Natural and standard colors. *Durethane Corp., 55th Ave. at 19th St., Chicago 50, Ill.*

AUTOMATIC TAPPING UNIT



THIS tapping unit has automatic forward and reverse movement of the tap, or external threading die, and can be mounted in any position and operated from remote electrical controls. It is capable of handling any size tap or die from 0-80 to $\frac{3}{8}$ -16. "Lead error" is eliminated by the use of a hardened and ground lead screw which projects the tap or die throughout the entire cycle of operation. Blind hole tapping to accurate depth may be accomplished. Lead screw and nut run in a constant bath of oil. The unit may be operated as many as 30 times a minute without overheating the motor. *Precision Thread Engineering Co., 2540 Park Ave., Detroit 1, Mich.*

(Please turn to page 172)

EATON

Permanent Mold Gray Iron Castings



for VEE-BELT PULLEYS AND SHEAVES

Uniform structure throughout the casting

Freedom from growth and segregation

Good tensile strength

Ability to take high surface finish

Free machinability

Eaton Foundry Division engineers will be glad to discuss the application of Eaton Permanent Mold Gray Iron Castings to your product. Send for the illustrated booklet, "A Quick Picture of the Eaton Permanent Mold Process for Producing Gray Iron Castings."

EATON MANUFACTURING COMPANY

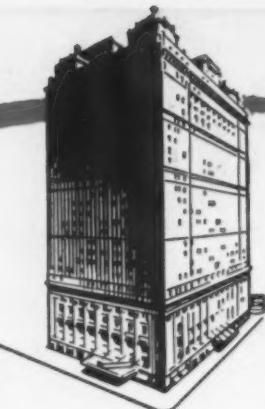
CLEVELAND, OHIO

Foundry Division

9771 French Road • Detroit 13, Michigan



PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS



Hotel Book-Cadillac
Detroit, Michigan

"We Completely Eliminated Excessive Heating in a Master Control Switch in Our Hotel"

"The 800 ampere renewable fuses, formerly used in the switch controlling a generator, gave us a lot of trouble due to excessive heating. This heating caused them to open 4 or 5 times a year.

"The problem was a serious one.

"On January 22, 1948, we replaced the fuses with 600 ampere Fusetron fuses. That was 15 months ago and to date not one Fusetron fuse has opened. The Fusetron fuses are operating very cool and have completely eliminated the excessive heating in the switch.

"We're certainly pleased about the ability of Fusetron fuses to hold in this installation."

John E. Nesmith, *Chief Electrician,*
HOTEL BOOK-CADILLAC
Detroit, Mich.

When we
Switched to . . .

Facts About FUSETRON Dual-Element FUSES

The fuse link element opens on short-circuit — the thermal cutout element protects on overloads — the result, a fuse with tremendous time-lag and much less electrical resistance.

They have the same degree of Underwriters' Laboratories approval for both motor-running and circuit protection as the most expensive devices made.



Made to the same dimensions as ordinary fuses — fit all standard fuse holders.

Obtainable in all sizes from 1/10 to 600 ampere, both 250 and 600 volt types. Also in plug types for 125 volt circuits.

Their cost is surprisingly low.

Fusetron® Fuses

with their

10 Point Protection

- 1 Protect against short-circuits.
- 2 Protect against needless blows caused by harmless overloads.
- 3 Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.
- 4 Provide thermal protection — for panels and switches against damage from heating due to poor contact.
- 5 Protect motors against burnout from overloading.
- 6 Protect motors against burnout due to single phasing.
- 7 Give DOUBLE burnout protection to large motors — without extra cost.
- 8 Make protection of small motors simple and inexpensive.
- 9 Protect against waste of space and money — permit use of proper size switches and panels.
- 10 Protect coils, transformers and solenoids against burnout.

Stop Wasting Time and Money



FUSETRON Dual-Element Fuses
Give ALL-PURPOSE PROTECTION

One needless shutdown — or one lost motor — or one destroyed switch or panel — may cost you far more than replacing every ordinary fuse with a FUSETRON dual-element fuse.

Don't risk such losses — protect yourself by installing a FUSETRON dual-element fuse in every set of fuse clips throughout the entire electrical system.

(FUSETRON is a trade mark of the Bussmann Mfg. Co., Division of McGraw Electric Co.)

Bussmann Mfg. Co., University at Jefferson St. Louis 7, Mo. (Division McGraw Electric Co.)

Please send me complete facts about FUSETRON dual-element Fuses.

Name _____

Title _____

Company _____

Address _____

City & Zone _____ State _____ 949

There's a Hint for Better Drawings in—

The Case of the Sightly Secretary



Engineer: Look at the artistic revision job Miss Jones is doing.

Draftsman: Nice mat surface, too! That reminds me that we should make all our drawings on Arkwright Tracing Cloth. It stands revisions so much better than perishable tracing paper.

Revision means little to Arkwright Tracing Cloth. It stands up without wearing through and re-inks without feathering. Its translucency is built in from surface to surface. For only a thrifty trifle more in cost, it will pay you to make *all your drawings* on Arkwright. Then you can count on perfect reproduction after repeated handling or years of aging in the file.

See for yourself how much better Arkwright serves. Sold by leading drawing material dealers everywhere. Generous working samples on request. Arkwright Finishing Company, Providence, R. I.

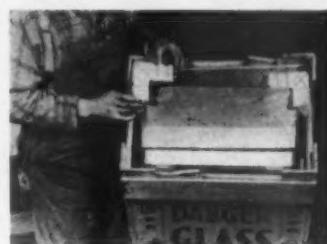
The Big Six Reasons Why Arkwright Tracing Cloths Excel

1. Erasures re-ink without feathering.
2. Prints are always sharp and clean.
3. Tracings never discolor or go brittle.
4. No surface oils, soaps or waxes to dry out.
5. No pinholes or thick threads.
6. Mechanical processing creates permanent transparency.



ARKWRIGHT
TRACING CLOTHS
AMERICA'S STANDARD FOR OVER 25 YEARS

PROTECTIVE PACKAGING MEDIUM



NEW protective packaging medium, made of molded wood-pulp, can be used on very small or very large items that are round, square, oval, rectangular or a combination of all, and which can be damaged in transit. Illustration shows standard corner pieces for square and rectangular items. On quantity items the material is specially molded to fit shapes other than square or rectangular. Tailor-made units are then fitted around the product easily. *Pulp Reproduction Co., Milwaukee, Wis.*

COMPACT PORTABLE FILTER

MODEL L50E filter for the filtration of chemical solutions is 17" long by 8" wide by 26" high and weighs approximately 70 lbs. It is available in stainless steel, brass, iron, and Saran, with rubber lined tanks, and can be used on any chemical solution. It has a small positive displacement pump rated at 275 gallons per hour and powered by a 1/3 hp motor. The unit can be carried from tank to tank for batch work or can filter continuously on a specific tank. It does not have to be taken apart for cleaning, and requires no parts, such as bags, sheets, or pads. *Titeflex, Inc., 533 Frelinghuysen Ave., Newark 5, N. J.*

TOOL GRINDER

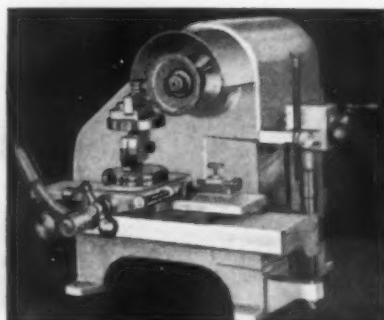


ILLUSTRATION shows compact new machine for grinding all automatic screw machine and turret lathe tools. Changes of fixtures and of set-ups can be accomplished within one or two minutes. Work holding fixtures are designed so that each cutting tool can be held in the same manner it is held in the die-head or tool holder while at work in the machine. Simplicity of machine permits operators with limited skill to do expert tool sharpening, maker claims. Variety of work holding fixtures available. *Gopher Machine & Engineering Co., 3333 University Ave. S.E., Minneapolis 14, Minn.*

(Please turn to page 174)

Starrett HACKSAWS



"S-M" MOYBDENUM for hand sawing and for light and heavy power sawing, these blades are of special temper for high speed cutting and for hard metals. They have a remarkable record of performance and low cost per cut.



HIGH SPEED STEEL 18-4-1 Tungsten all hard blades for light and heavy power sawing to assure fast production on high alloy metals, stainless steel, phosphor bronze, tool steels, chrome steel, Monel metal and the like.



SAFE - FLEX for hand sawing — a high speed steel blade with hard edge and flexible back, a combination that makes it virtually unbreakable on the toughest hand sawing jobs.



STANDARD Flexible Back, All Hard and "Semi-Flex" in the right size and teeth per inch for hand sawing jobs of all sorts. Fast cutting, long lived, thoroughly reliable.

Write for Starrett Hacksaw and Band Saw Booklet "P"

TRADE MARK
Starrett
REG. U. S. PAT. OFF.

THE L. S. STARRETT CO. • Worlds' Greatest Toolmakers • ATHOL, MASSACHUSETTS, U.S.A.

SEPTEMBER, 1949

Want Additional Product Information? See Page 19.

HACK SAWS
Starrett
BAND SAWS

BAND SAWS

for Cutting Metal, Wood and Plastics



METAL CUTTING BAND SAWS with hard edge and flexible back, available in 10 widths, 3 gauges and 8 pitches, in coils of any desired length, or cut to length and welded ready to use.



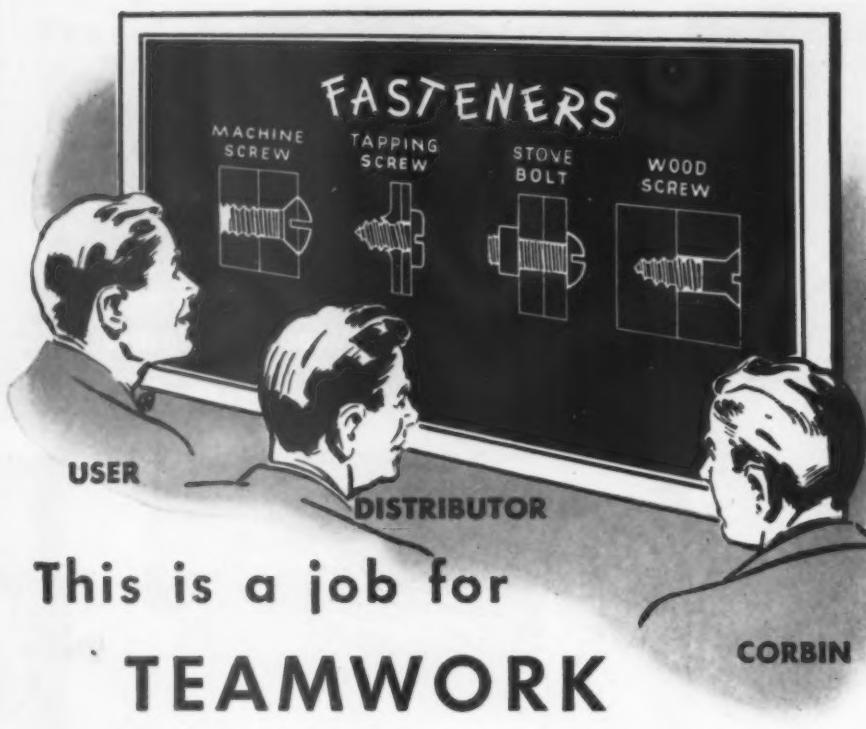
"SKIP-TOOTH" BAND SAWS for fast cutting of magnesium, aluminum, bronze, soft brass and other nonferrous metals; also for special compositions, fibre, bakelite; plastics and wood.

Specify "Starrett" Wavy Set
Band Saws For Use On All
Horizontal Band Saw
Machines

Standard of Precision

MECHANICS' HAND MEASURING TOOLS AND PRECISION
INSTRUMENTS • DIAL INDICATORS • STEEL TAPES • HACKSAWS
AND BAND SAWS • PRECISION GROUND FLAT STOCK

Buy Through Your Distributor



This is a job for TEAMWORK

If each of us will help the other, we can lick this job. Let's see how it shapes up:

USER "You can help me by filling my fastener orders promptly."

DISTRIBUTOR "I'm in the best position to do that for you, by maintaining adequate inventory. But you can help me by ordering standard listed sizes."

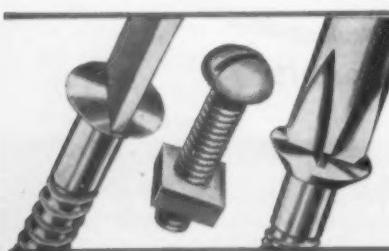
CORBIN "Right! The four standard fasteners shown on this blackboard look very simple, don't they? But your orders can be quite complicated.

"For example, you specify *types* of screw in Corbin-Phillips or Regular Slotted — *head styles* — *wire sizes* — *lengths* — *threads per inch* (in Machine Screws), *basic metal and/or finish* . . . all of which can add up to over 40,000 variations!"

"Short orders with quick delivery can generally be filled from stock provided we all stick to standard types and sizes."

"Let's raise our sights and cover more ground! Standard fasteners can be put to work much faster when they're *on hand* than when they're *on order!*"

ST-90



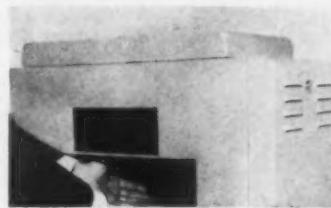
CORBIN SCREW DIVISION

THE AMERICAN HARDWARE CORPORATION • NEW BRITAIN, CONN.

Warehouses: New Britain • New York • Chicago

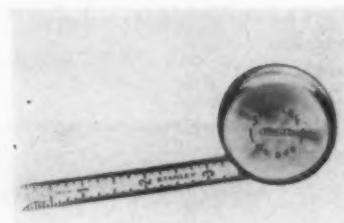
Want Additional Product Information? See Page 19.

ELECTRONIC TOWEL



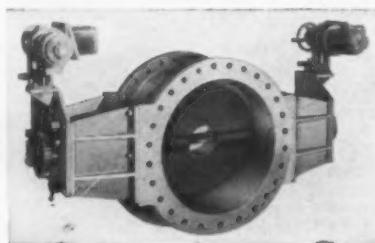
MEASURING only 26" x 14½" x 11", this electronic towel, which can be plugged into any circuit and attached to any wall, is said to be capable of drying and sanitizing hands in less than 30 seconds. Wet hands placed into a horizontal opening without coming into physical contact with switches, levers, pedals, etc., set off the drying operation. After hands have been dried and removed, the machine automatically shuts off. *Electronic Towel Corp.*, 57 William St., New York 5, N. Y.

"PULL-PUSH" RULES



NOS. 546 and 548 "Pull-Push" rules are supplied in a watch-size case, nickel-plated with a brushed satin finish. Vertical markings on blade make rules easier to read in any position. Attached blades are nickel plated, ½" wide—graduated in 16ths both edges, in 32nds on upper edge for first 12 inches. The 546 has a 6' blade and the 548 has an 8' blade. *Stanley Tools, New Britain, Conn.*

MOTOR-DRIVEN DUAL VALVE



TYPE No. 725 is a 36" by 8" 150-lb. class B steel dual valve for an operating temperature of 1000F. Body casting is chrome-molly steel. Powered by separate electric motors, each alloy steel vane is operated independently of the other for close control of volume and pressure. The valve is designed for either a high pressure drop and small volume or a low pressure drop and large volume. Available in all materials, in various combinations of sizes and for higher pressures. *R-S Products Corp., Wayne Junction, Philadelphia 44, Pa.*

(Please turn to page 176)

LIGHTING NEWS

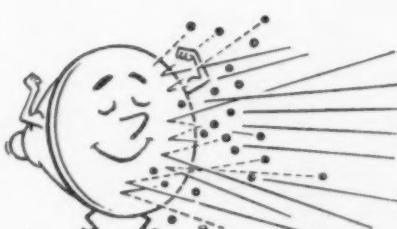
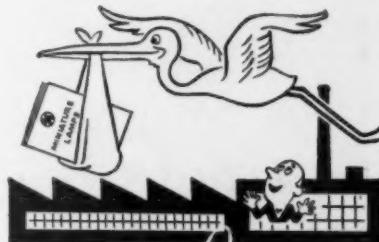
New lamps—new uses—money-saving ideas



New, bigger slimline fluorescent lamp now available. Better lighting plus operating economies are predicted for users of General Electric's T-12 slimline lamp. Biggest fluorescent of all, the newest addition to the slimline family measures eight feet long, has 1½-inch diameter. Rated 75 watts, it starts instantly (no starters used), has long life. Single-pin base permits quick, easy replacements. Write for copy of free booklet, "Modernize with G-E Slimline". General Electric, Div. 166-P9, Nela Park, Cleveland 12, O.

How to evaporate solvents at low cost. New Ohio chemical plant uses General Electric heat lamps for evaporating volatile solvents from plastic sheet, reports these savings: the installation costs less than other evaporating systems, uses simpler equipment. In addition, lamps in vertical banks take minimum floor space.

New miniature lamp catalogue first ever published. For the first time, buyers have a complete simplified guide to selection of the small lamps used in countless indicator, automotive and specialty applications. General Electric's new catalogue classifies, describes and gives prices of 175 types and sizes. 36 pages. For your free copy, write General Electric, Div. 166-P9, Nela Park, Cleveland 12, O.



Tough lamps shrug off shot blast. Lighting shot-blasting areas without ruining the lighting equipment used to be a problem. Usual practice has been to mount bulbs in heavy glass globes. But that's cumbersome and costly. The G-E locomotive plant in Erie found a simpler way that saves money. Standard one-piece floodlamps (PAR 38) mounted on the walls light the shot-blasting room. Lamps last normal life despite severe abrasive action of shot, which wears the hard glass away to fraction of original thickness.

"Housewife-proof" lamp makes bow. A new 10-watt pilot lamp for ranges, radios, freezers, etc., just announced by General Electric is designed to withstand all the jolts and jars that a housewife can give a home appliance. The new lamp should last at least five years under normal usage.

For more data on the items above and for complete information on lamps and lighting, phone your local General Electric Lamp Dept. office.

You can put your confidence in—

GENERAL ELECTRIC

THE
Easy-to-handle
 GEARED
 PIPE
 THREADER



RIDGID No. 4P's handles take the struggle out of carrying and putting on pipe

● Even when you feel like a Tarzan you appreciate the sensible balanced loop handles that make the 4P easy to pick up, carry and work with. Mistake-proof workholder sets to size *before* you put it on pipe, one screw to tighten, no bushings. 4 sets of 5 high-speed steel chaser dies give clean accurate threads on 2½," 3," 3½" and 4" pipe. Ratchet handle furnished—**RIDGID** Universal Drive Shaft and Power Drive available for power-threading. For perfect threads easily, order the **RIDGID** 4P from your Supply House.

RIDGID
 WORK-SAVER PIPE TOOLS
 THE RIDGE TOOL CO. • ELYRIA, OHIO

MAGNESIUM SAFETY BLOCKS



SPECIALLY-alloyed extruded magnesium blocks are used in metal forming presses as a safeguard to men working within the opening of the press. They are available in any required lengths and in three sizes to cover a wide range of press capacity. Features claimed are: certified permanent strength properties; extreme light weight; correct shapes for best press applications; high unit strength and maximum resistance to shock. Bulletin 1114. Magline, Inc., Pinconning, Mich.

INDUSTRIAL GLOVE



NL-52 Stanzoil Heavy Duplex industrial glove is a heavy weight, extra large size, extra length glove with an elastic knit lining. It is furnished in sizes 10 and 11, is made of elastic, knit-lined neoprene, and is 14" long. The fingers are straight and coated with Pioneer non-slip finish. Pioneer Rubber Company, Willard, O.

SAFETY SOCKET CLAMP



SOCKET clamp for use with all standard medium base sockets consists of two identically formed rings of heavy gage steels. Assembly is easy and quick. One ring fits over the socket cap, the other slides over the socket shell until it rests on the socket shoulder. Two machine screws clamp the rings together, eliminating hazards of broken sockets. No special cap is required. One size clamp fits all sockets. Vimco Mfg. Co., Inc., 109 Brayton St, Buffalo 13, N. Y.

enclosed gear drives...

for every industrial need!

Foote Bros. Hypower Worm Gear Drives, both horizontal and vertical types, offer new economies in space, weight and cost. Increased load-carrying capacity is accomplished by a revolutionary technique in generating gears. The oil bath is cooled by passing a high velocity stream of air through an air channel cylinder immersed in the bath. This provides greatly increased thermal capacity.

Foote Bros. Hygrade Worm Gear Drives are available in a wide variety of types. This line is

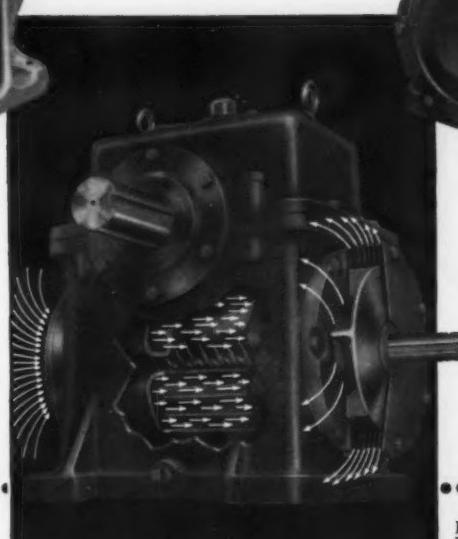
newly designed and includes sizes and ratios to meet practically any requirement.

Foote Bros. Maxi-Power Helical Gear Drives are available in single, double and triple reductions. This newly developed line assures maximum performance made possible by the latest in engineering development and by improved methods in manufacture.

Regardless of what your requirements in gears or enclosed gear drives may be, call on Foote Bros. There is a sales office or representative near you.



MAXI-POWER
ENCLOSED HELICAL
GEAR DRIVES



HYPOWER ENCLOSED
WORM GEAR DRIVES



HYGRADE ENCLOSED
WORM GEAR DRIVES

FOOTE BROS.

Better Power Transmission Through Better Gears
FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. PG, 4545 South Western Boulevard • Chicago 9, Illinois

Foote Bros. Gear and Machine Corporation
Dept. PG, 4545 S. Western Blvd., Chicago 9, Ill.

Please send me bulletins or information on

- Hypower Enclosed Worm Gear Drives
- Hygrade Enclosed Worm Gear Drives
- Maxi-Power Enclosed Helical Gear Drives

Name _____

Company _____

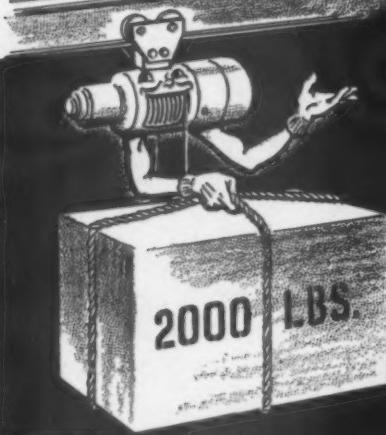
Address _____

City _____ State _____

CAN YOU GUESS THE ANSWERS?

WHAT "STRIPPER" WORKS IN OVERALLS?

IN MANY PARTS OF THE COUNTRY A "STRIPPER" IS NOT A BURLESQUE QUEEN, BUT A COAL MINER IN A STRIP MINE. "STRIP MINING" REQUIRES QUANTITIES OF LAY-SET PREFORMED WIRE ROPE, MADE BY ACCO'S HAZARD WIRE ROPE DIVISION.

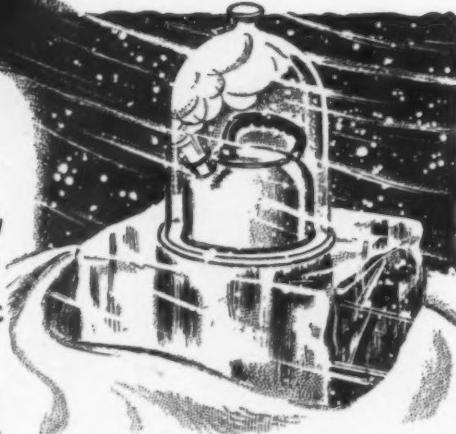


WHAT MACHINE LIFTS 18 TIMES ITS WEIGHT?

WEIGHING ONLY 107 POUNDS, A WRIGHT SPEEDWAY ELECTRIC HOIST WILL LIFT A TON AT THE TOUCH OF A BUTTON. MADE BY ACCO'S WRIGHT HOIST DIVISION.

HOW COULD WATER BOIL AT 32°F?

WATER BOILS AT 32° FAHRENHEIT IN A PERFECT VACUUM. ACTUALLY, IT WILL BOIL AT RELATIVELY LOW TEMPERATURES IN A PARTIAL VACUUM. WATER BOILS AT 212°F ONLY AT 30" BAROMETRIC PRESSURE. ACCO'S HELICOID GAGE DIVISION MAKES GAGES THAT ACCURATELY MEASURE VACUUM AS WELL AS PRESSURE.



ACCO Products Include: AMERICAN Chain • TRU-LAY and LAY-SET Preformed Wire Rope • TRU-LAY Cable and TRU-LOC Swaged Terminals for Aircraft • TRU-STOP Emergency Brakes • PAGE Wire, Chain Link Fence and Welding Rods • CAMPBELL Abrasive Cutters • READING-PRATT & CADY Valves and Fittings • READING Steel Castings • PENNSYLVANIA Lawn Mowers • MARYLAND Bolts & Nuts • "ROCKWELL" Hardness Testers • WRIGHT and FORD Hoists • HELICOID Pressure Gauges • MANLEY Automotive Service Equipment • OWEN Silent Springs.

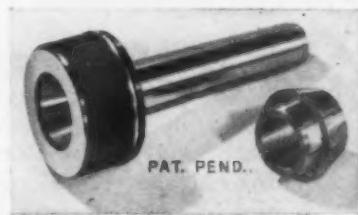
ACCO



AMERICAN CHAIN & CABLE BRIDGEPORT CONNECTICUT

CENTERLESS SHAFT SUPPORT CHUCK FOR LATHES

This device, known as the Adjustable Collet Bushing Chuck, makes possible easy and accurate centering in the lathe of any shaft $\frac{1}{4}$ " to 1" in diameter. It is manufactured with No. 2 or No. 3 Morse taper shanks for use in either the headstock spindle or the tailstock spindle of



the lathe. Brass collet chucks can be supplied for round stock in sizes from $\frac{1}{4}$ " to 1", by 16ths. When used in the lathe headstock, the chuck may be adjusted to drive the work or, when used in the tailstock, may be adjusted for an accurate running fit. *South Bend Lathe Works, 309 E. Madison St., South Bend 22, Ind.*

SUPERHEAT LOST IF STEAM LINE TOO LARGE FOR STEAM FLOW

Regardless of the thickness of insulation used, a surprisingly large loss of steam superheat may occur if the diameter of the steam line is too large for the desired steam flow conditions, according to the Magnesia Insulation Manufacturers Association.

Such a case occurred recently in a plant where an outdoor line, 6 in. in diameter and 925 ft. long, with an ambient air temperature of 80 F, was used to transmit superheated steam at 250 psi and 600 F. The line was insulated with 2-5/16-in. thick 85% Magnesia pipe insulation. However, the steam temperature at the end of the line was only 450 F.

An analysis indicated that the steam velocity in the line was only a little over 1,300 ft. per minute, whereas it should have been between 6,000 and 10,000 ft. per minute. The result was that, due to the relatively large size of the pipe and the relatively low steam velocity, there was a large drop in superheat. The investigation showed also that simply increasing the amount of insulation would have no appreciable effect on the extent of superheat loss. The recommendation was that it would be cheaper and more satisfactory to replace the 6-in. line with a 1½ or 2-in. pipe, insulated with 3-in. thick 85% Magnesia.

Literature on correct procedure for piping system design, recommended pipe sizes, steam velocities, flow conditions, etc., may be obtained from valve and piping manufacturers and fabricators. The information is also available in the various engineering handbooks. Literature on recommended thicknesses of insulation can be obtained from the Magnesia Insulation Manufacturers Association, Washington 4, D.C.

(Please turn to page 180)

**SCRAP LOSS REDUCED
FROM \$2665 TO \$306
IN ONE MONTH!**



**This remarkable instrument steps up production
for Michigan non-ferrous foundry**

ONE of the largest producers of propellers for outboard and in-board motors had trouble in the foundry with porous castings.

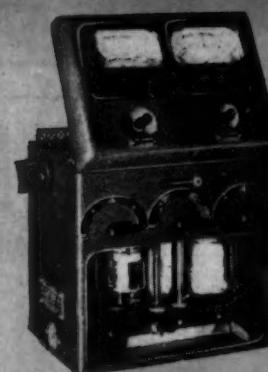
A Cities Service combustion specialist was called in for consultation. With the aid of the Cities Service Industrial Heat Prover instrument he soon found that the trouble was

due to the presence of excess air in the furnace gases and offered suggestions to correct the situation. Result: Scrap loss was reduced from 4100 to 471 lbs. and affected a saving of \$2359.

Countless cases of similar results are now on file. If your operation includes industrial furnaces and

heat treating units of any size or type, you too can profit from such service. Write today for a free demonstration.

FREE! A fact-filled booklet entitled "Combustion Control for Industry" is available upon request. Write Cities Service Oil Company, Sixty Wall Tower, Room 477, New York City 5, N.Y.



Cities Service Industrial Heat Prover analyzes exhaust gases quickly and accurately. Indicates either improper percentage of air or excess combustibles in the furnace gases.

CITIES  SERVICE

for **LOW COST**

**All-electric Adjustable Speed —
the ACA Motor**

* \$413.00

3 hp

3 to 1 speed range



- Stepless adjustable speed from a-c power, 3-75 hp
- Completely packaged in a single compact unit
- Speed adjustment dial can be remotely located
- Other speed ranges available: 6-1, 10-1, 20-1
- Immediate shipment on ratings through 15 hp

For additional information and prices write—Apparatus Dept., Sec. 752-1, General Electric, Schenectady, N. Y.

*Manufacturer's suggested retail price.

GENERAL ELECTRIC



752-1

**FREE SWATCH BOOK PRESENTS
KIMPAK CREPED WADDING**

Swatch book available from the Creped Wadding Division, Kimberly-Clark Corporation, Neenah, Wis., contains six specifications representing the most popular lines of Kimpak used for interior cushioning in packaging and for many other uses including padding, filtration, protective linings, etc. Kimpak is an in-



Interior of the Kimpak creped wadding swatch book

dustrial creped wadding made of wood cellulose fibers. It is manufactured in two forms—moisture absorbent and moisture-resistant. It complies with packaging specifications of Government and the railroads, and Post Office regulations for parcel post shipments of liquids and easily liquefiable materials.

1 1 1

**NEW SYNTHETIC RESIN FOR
BINDING SAND CORES**

The Plastics Department of American Cyanamid Company, Rockefeller Plaza, New York, N. Y., recently introduced a new synthetic resin developed for the binding of sand cores. This new resin is the result of extensive research on foundry problems and will be marketed under the trade-name of Cycor 151.

It is a neat, thermosetting resin made under carefully controlled conditions and especially prepared as a water resistant foundry core binder. It contains no filler or additives of any kind. The foundry may vary the amount of Cycor 151 and/or additives to obtain cores with green and baked tensiles, permeability, hardness and collapsibility necessary for the type casting to be made. Its use also makes possible cleaner, more uniform castings.

Cycor 151 produces water resistant cores which withstand high humidity and long lay-overs in molds. It can be cured in either conventional or dielectric ovens and allows quick-cured cores for rush jobs. Because Cycor 151 is a pure resin, only small quantities are required. The user purchases only the neat synthetic resin, modifying it with fillers and extenders to meet his own special requirements. The short baking cycle required increases oven turnover and thus increases production per hour. Cycor 151 gives foundries 33% to 50% faster baking time than old-time binders at baking temperatures of only 350° F. The excellent collapsibility insures savings in shake-out and cleaning.

(Please turn to page 182)

PAGE FENCE - Since 1883

• AMERICA'S FIRST WIRE FENCE •



Let
an Expert
Advise You

- Yes, a fence is a needed protection. Persons and property should be safeguarded against common hazards, but perhaps you are puzzled about the kind of fence you should have—the right style and height—the fence metal that best meets your needs. Near you is a local, reliable and experienced fence

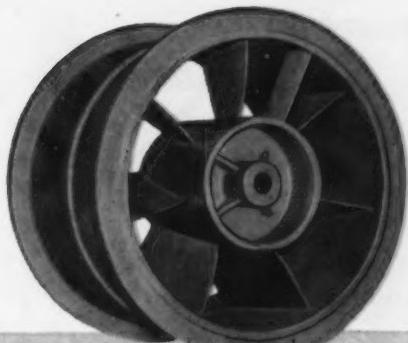
specialist who will gladly supply every fact you need and help you decide on the fence you should have. He will supply cost estimates—no obligation—and will erect your fence expertly. Write for detailed information about Page Chain Link Fence and we will send you his name and address.

Write to PAGE FENCE ASSOCIATION in Monessen, Pa., Atlanta, Bridgeport, Chicago, Denver, Detroit, Los Angeles, Philadelphia, Pittsburgh, New York or San Francisco.

PRODUCT OF PAGE STEEL & WIRE DIVISION OF AMERICAN CHAIN & CABLE COMPANY, INC.



ACCURACY



STRENGTH



WEAR RESISTANCE



SHOCK RESISTANCE

What *Qualities* do you
look for in Non-Ferrous
BEARINGS and CASTINGS?

You want ALL FOUR, of course . . . and you get ALL FOUR qualities plus better performance and greater long-range economy when you specify N-B-M Bearings and Castings.

The bearings and castings shown above are typical results of these complete—and modern—facilities that you'll find at National Bearing Division:

Research—

American Brake Shoe's extensive research labs, containing the latest in testing equipment, are always at the disposal of N-B-M for all types of research on customers' problems.

Engineering—

The N-B-M Engineering staff is fully qualified to work either for or with you in solving problems of stress, alloy or over-all design of bearings and castings.

Production—

From precision molding to final machining, N-B-M has the latest manufacturing techniques that assure you of products with maximum strength, precision, wear-resistance and density.

Quality Control—

Modern X-Ray, Photomicrographing equipment, and other latest testing devices provide a surety for you of castings that meet and often exceed your specifications.

Yes, if qualities that insure longer, more economical service are important for the Bearings and Castings used in your plant or product, call in your nearest N-B-M Representative. He will be glad to give you specific information on how this complete N-B-M service can be applied to your problems.



AMERICAN

Brake Shoe

COMPANY

NATIONAL BEARING DIVISION

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PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.



CONTINENTAL makes them all and thousands more

Of all the 400,000 varieties of fastenings that literally hold our industries together, Continental makes a large proportion marketed under the famous HOLTITE trade name. Most of them are standard — screws, nuts, and bolts for every use in every industry. Others like the well-known HOLTITE-Sems and HOLTITE-Phillips screws are patented specialties and the famous HOLTITE-Thredlock, Lockite and Tap screws were first designed and produced by HOLTITE. Sometimes a fastening engineered by HOLTITE for one industry finds an unexpected use in another. Often a HOLTITE-Engineered fastening will replace several parts that a manufacturer is using. Why not discuss your fastening requirements with a Continental Sales-Engineer. He will focus on your requirements all the broad industrial-fastening experience and ingenuity of Continental. Remember Continental is constantly improving HOLTITE products, lowering their cost and broadening service.

ENGINEERED FASTENINGS FOR PRODUCT ENGINEERS

A. HOLTITE-Phillips Type "H" Brass Tap (coarse thread—patented slotted point) Screw designed to eliminate taps and tapping operations in fastening polystyrene refrigerator assemblies.

B. Hex-head lag screw, a special development for fastening metal to wood in aircraft assemblies.

C. Special shaped screw to hold sections of home utensil in alignment by small lug at end of thread. Assures proper assembly of utensil after cleaning.

D. HOLTITE-Phillips Set Screw, used in assembling glass panel store fronts. Eliminates driver damage to costly polished panels. Screws made of Aluminum, Stainless Steel or Silicon Bronze to prevent staining.

This Trademark
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SCREW COMPANY
1904 NEW BEDFORD, MASS., U.S.A.



1949

LOW COST HARD STEEL GRINDING TO TENTHS OF THOUSANDTH INCH

Diaform wheel forming attachment being introduced by Pratt & Whitney, West Hartford, Conn., is a single light-weight portable instrument which is described as the answer to a troublesome problem in the tool and die industry, namely, the ability to form-grind in hardened steel to tenths of a thousandth of an inch at low cost. The Diaform attachment is a portable, precise, wheel forming instrument which, tracing from templates, will



Pratt & Whitney Diaform attachment for low-cost precision dressing of grinding wheels for accurate form grinding in solid hardened steel

form dress wheels to "tenths" by means of a dressing diamond. It operates on the pantograph principle, tracing from a 10 to 1 ratio template with such fidelity and rapidity that the dressing operation for a complex form can be completed in a matter of minutes. The attachment can be used on any horizontal spindle surface grinder and will consistently provide the required accuracy in wheel form if the machine spindle is in good condition. Printed matter available.

LOWER COSTS ATTRIBUTED TO GRADIATION SPEED HEATING

The extension of gas combustion to new levels of usefulness in industrial processing by more effective heat-transfer to metals under precise control and at high rates of speed, is described in booklet "Speed Heating of Metals by the Gradiation Process", (78 pages, illustrated) published by the Selas Corporation of America, Erie Avenue and D St., Philadelphia 34, Pa. The Gradiation method of speed heating, coordinates rapid metal heating with automatic equipment. "In effect", the authors say, "Gradiation has re-introduced gas to industry as a heating agent and has raised potential uses . . . to levels that formerly were not contemplated." The booklet notes advantages of the process as including time-saving, labor-saving, metallurgical improvements, and uniform production. Applications of the method, present and future, to heating for forging, brazing, and hardening are visualized, together with heating bars, tubes, billets and strip. Steel, copper and copper alloys are considered with descriptions of metallurgical benefits illustrated by photomicrographs. Copies of the booklet are available upon request.

(Please turn to page 184)

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by BRIDGEPORT BRASS COMPANY "Bridgeport" Headquarters for BRASS, BRONZE and COPPER

Cutting Costs of Fabricated Goods

What can be done to cut fabricating costs of metal goods? This problem is uppermost in the minds of manufacturers.

Because of high labor, material and overhead, many have been operating dangerously close to the break-even point even during busy times. They realize how quickly profits can turn into losses if volume is reduced as little as 10%. Today's wary buyers are looking either for lower prices or higher values.

Among the likely ways to cut costs, fabricators are studying the following suggestions:

1. Simplification of products.
2. Elimination of operations.
3. Reducing finishing costs, extra operations and bad work.
4. Increasing operating speeds.
5. Changing methods of fabrication to reduce finishing costs.
6. Installing more modern labor-saving equipment.
7. Improving work-flow and materials handling.
8. Reducing maintenance through better materials.

Simplification of Products

Redesign has played an important part in cutting costs and increasing sales. For example, in builders' hardware, large, heavy front door locks with cast brass handles and escutcheon plates are rapidly being replaced by smaller, more efficient units. Cast door knobs and escutcheons are now made from brass stampings. The cylindrical lock body requires only two drilled holes for installation. Most old line products can stand simplification of design with corresponding reduction in operations and costs.

Elimination of Operations

It is often possible to increase the severity of drawing operations between anneals by changing the temper or by using a more ductile alloy, thereby eliminating an annealing operation.

Sometimes additional operations, not originally included in the original estimate, creep in. For example, a burr may have developed on a flange and instead of correcting the tools, a polishing operation is added. Extra costs such as this can be prevented.

Reducing Polishing Costs and Spoiled Work

Because finishing costs involve a large percentage of direct labor, careful control of annealing to produce small grain sizes and smoother metal, cuts down polishing time. Much also



Cast Brass Nut Wrought Brass Nut
Finishing costs lowered when changing from casting to wrought metal.

can be done through careful handling during various stages of manufacture towards preventing dents and scratches which are expensive to remove. Battery grouping of operations, specially-designed work trays, and good house-keeping are helpful measures.

Increasing Operating Speeds—More Modern Machines

Many manufacturers have succeeded in speeding up their machining operations by changing to copper-base alloys containing lead in varying amounts. Where compromise between much ductility and some machinability is required, small amounts of lead from 0.15 to 0.50% are helpful.

Installation of more dial and hopper feeds often permits speeding up of equipment resulting in higher production and lower unit cost.

Newer, more modern equipment may be the answer to lower costs if higher speeds are to be attained. Or, where volume warrants it, a change to equipment of the progressive operation type will increase production and reduce rejects.

Changing Methods of Fabrication

A manufacturer, tired of the excessive cost of polishing rough sand castings of brass, turned to brass screw machine parts, which could be polished on automatic equipment. Another replaced sand castings with parts made from tubing involving stamping operations.

Better Work Flow and Materials Handling

Rearrangement of machines and equipment to eliminate awkward handling; integrated departments to avoid unnecessary transportation from one room to another; more liberal use of modern conveyor systems and methods will increase production and cut labor costs.

Reducing Shutdowns and Maintenance Through Better Alloys

Corrosion, the enemy of all metals, is finding more opposition from copper and its alloys. Destruction from corrosion means expensive maintenance, shutdowns, repairs and eventual replacement—all of which involve high labor costs. As a result more attention has been given during the past years to specifying more corrosion-resisting alloys for vital parts.

Fabricators are turning more and more a listening ear to the suggestions which are made by employees. A careful study of even the smallest hint as to ways of increasing production may bring major savings.

Since the use of the correct metal and temper play such an important part in economical fabrication, manufacturers will find the services of our Metallurgical Laboratory helpful in solving their problems.

BRASS • BRONZE • COPPER • DURONZE — STRIP • ROD • WIRE • TUBING

MILLS IN
BRIDGEPORT, CONNECTICUT
INDIANAPOLIS, INDIANA

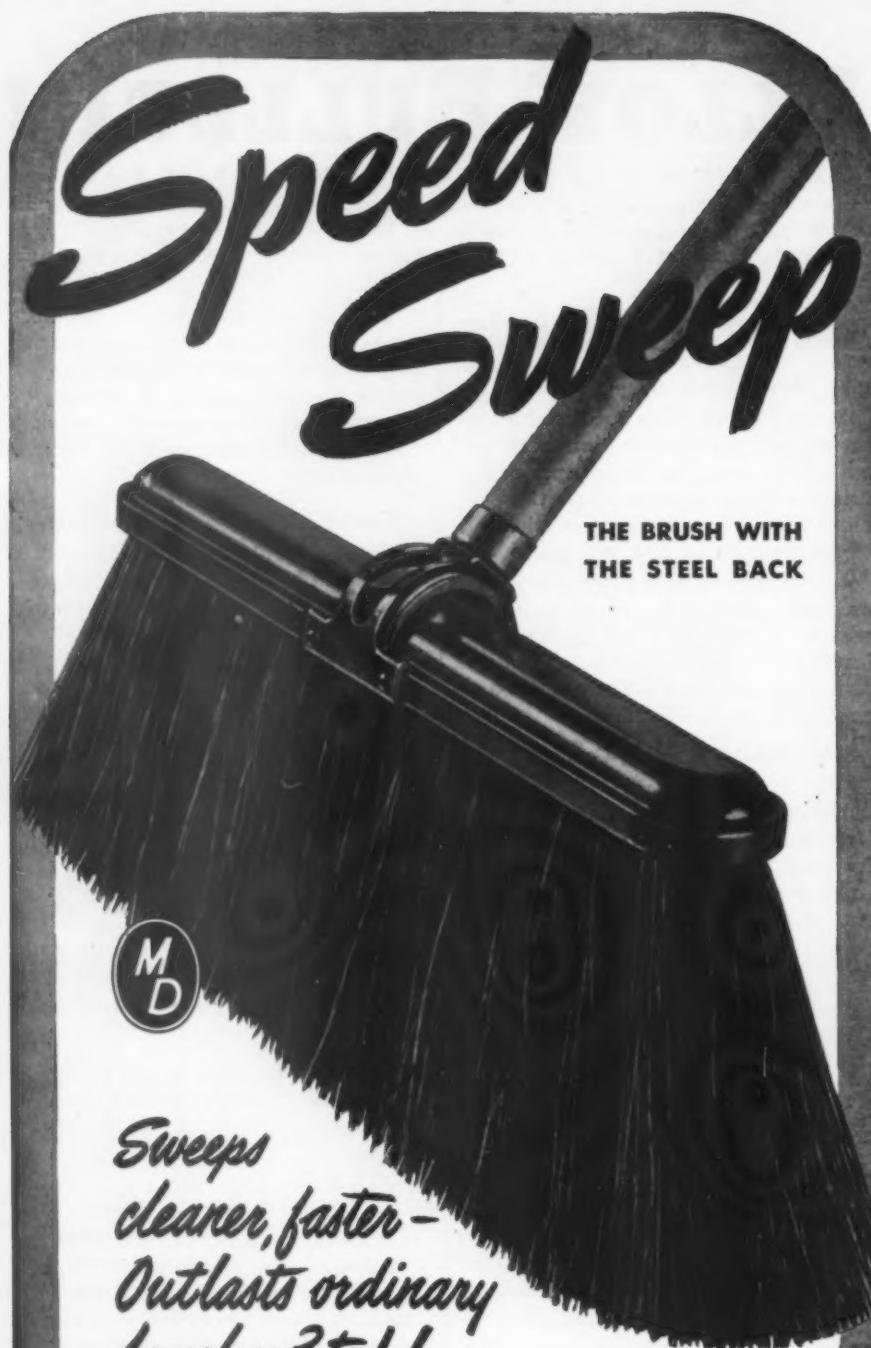
In Canada:
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**THE BRUSH WITH
THE STEEL BACK**

*Sweeps
cleaner, faster—
Outlasts ordinary
brushes 3 to 1!*

Speed Sweep brushes have a steel back which is the basis of unique design for faster, easier, better sweeping. Block is $\frac{1}{3}$ usual size for easier handling. Tufts are longer and more compact, providing "spring and snap" action. Handle is instantly adjustable to height of sweeper—reduces fatigue and strain. Speed Sweep brushes are sturdy—they contain highest grade materials and are constructed for long life. Speed Sweep brushes have been proved by so many firms and under such varying conditions that they are unconditionally guaranteed to meet your needs. Mail coupon today for complete information about sizes, styles and prices.

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530 North 22nd St., Milwaukee 3, Wisconsin**

Please send complete information about Speed Sweep Brushes

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**SIX-MONTH CONSTRUCTION
VOLUME COMPARES FAVORABLY
WITH '48**

The volume of construction performed by The H. K. Ferguson Company, industrial engineers and builders, during the first six months of 1949 compares favorably with other six-month periods of the past two record volume years, Otto F. Sieder, Executive Vice President and General Manager, announced recently.

Although exact figures were not disclosed, it was said that total construction volume for the first half of 1949 exceeded \$25,000,000, and consisted of industrial facilities for many industries, as well as the Government, both in this country and abroad.

"Our present backlog of work reflects the general curtailment of construction in almost all fields of industrial activity," Mr. Sieder said. "It is consequently lower than it was at this time last year, but we are optimistic that it will return to a higher level during the next six months."

Mr. Sieder said that the optimism of the company is based on the trend toward stabilization in industry. Construction costs can now be predicted with a reasonable degree of accuracy, and reductions up to 10 per cent have been noted in many parts of the country.

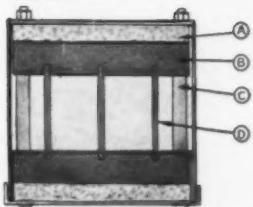
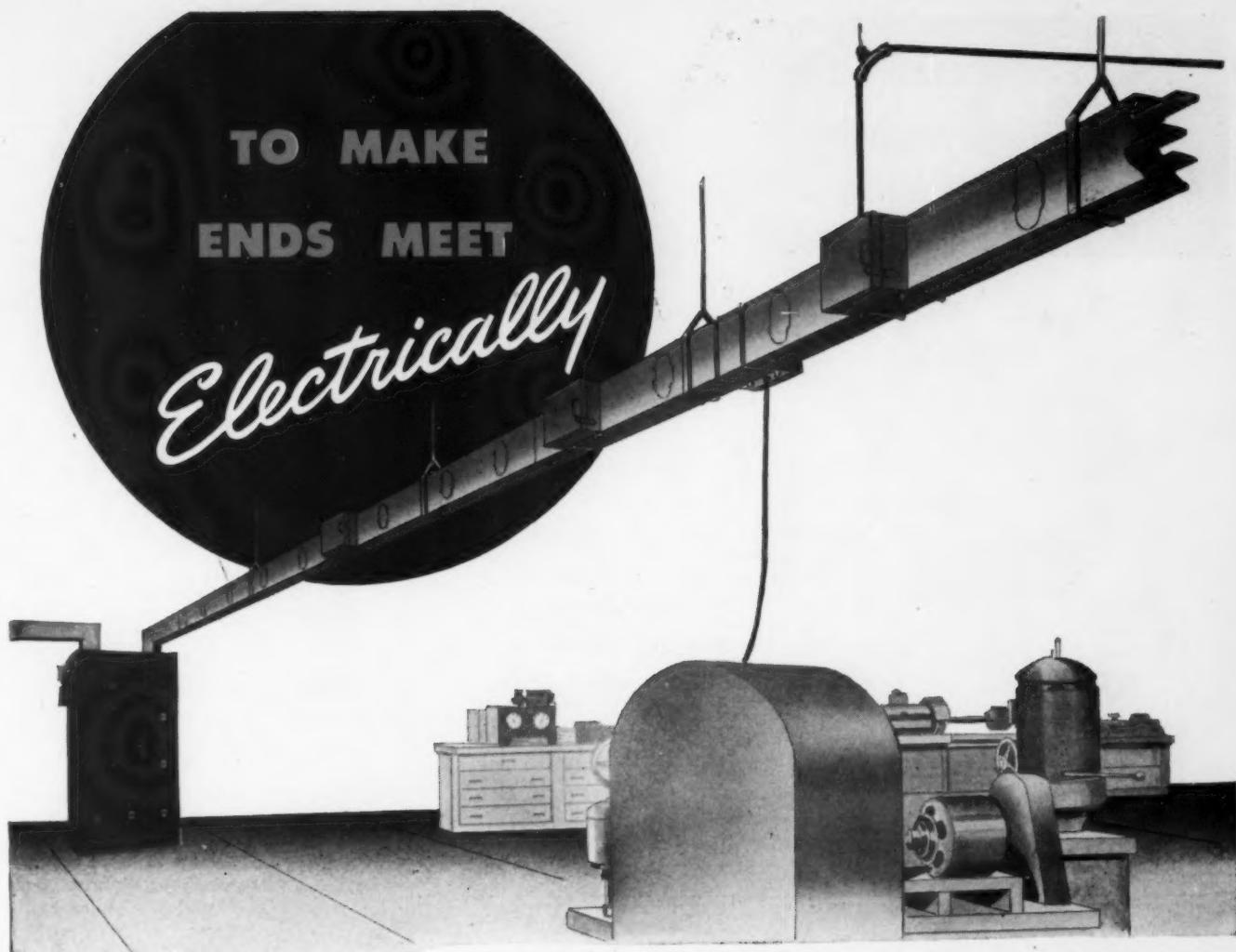
Mr. Sieder said he expected the release of many large building programs which have been deferred by nationally-known corporations since the last presidential election. Two factors responsible for postponement of industrial expansion and modernization programs have been the general economic pattern and the uncertainty over taxes. The general economic pattern seems to be stabilizing, he said, and taxes will not be raised over 1948 rates. He believes both actions will have a positive effect in reviving industrial construction undertakings this Fall.

"Competition has become increasingly keen," Mr. Sieder said. "The practice of awarding contracts on competitive bidding is on the rise, although this method is not generally feasible for chemical and process plant construction."

**MASS PRODUCTION OF STAINLESS
STEEL POWDER MACHINE PARTS**

Mass production of finished machine parts from stainless steel powders is announced by the Amplex Manufacturing Co., Oilite Division of Chrysler Corp., Detroit 11, Mich. Among the first precision parts to be produced is a cam for an application in which contamination cannot be tolerated. The stainless steel parts can be impregnated with oil if desired. The parts' inherent tensile strength is 33,000 psi, and they maintain their strength at both low and high temperatures. The Oilite parts are said to be ideal for gears, levers, cams, blocks, gibs, pulleys, rachets, and intricate structural parts. The company also manufactures bearings and permanent filters from stainless steel powders.

(Please turn to page 186)



(A) Steel supporting channel; (B) Rugged porcelain insulators; (C) Fibre insulator spacers; (D) Copper bus bar conductors.



PLUGIN  BUS BAR JOINT. All bus bars are hard drawn, round edge, rectangular copper of 98% conductivity. Joint contact surfaces are heavily ELECTRO-SILVER Plated. Brass jam bolts, with compression washers on each side, fit into elongated holes to permit contraction or expansion at each joint.

From power source to machine, the most economical electrical path is Plugin  Busduct! It saves time! It saves money! It saves electricity!

Plugin  Busduct provides a plugin outlet every foot of the way... permitting relocation and installation of machinery quickly. Mounted on ceilings, along walls, or even above baseboards, standard 10-foot lengths and special lengths can be arranged to fit any electrical requirement. Plugin  Busduct eliminates costly temporary connections and expensive, long lead-ins... permits a speedy change in plant or electrical layout without disrupting production... and reduces voltage loss to a minimum.

Any way you look at it, Plugin  Busduct makes ends meet... electrically, efficiently, and economically!

Capacities: 225 to 1000 amps., 600 volts, 2-3-4 conductors.

Write for Bulletin No. 701 or see your nearest  Representative (he's listed in Sweet's).



Frank Adam Electric Co.
ST. LOUIS 13, MISSOURI
Makers of BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

**Six Good Reasons to
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for Special Hinges
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1. Comprehensive Engineering Service
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Let Stanley supply all your pressed metal parts. Our A to Z facilities for the design, production and fabrication of special hinges, stampings, and deep drawings can take this entire load from you . . . from the first sketches to the finished article.

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PRESSED METAL DIVISION—THE STANLEY WORKS

New Britain, Conn.

New York • Detroit • Los Angeles • Chicago • San Francisco • Seattle

HARDWARE • HAND TOOLS • ELECTRIC TOOLS • STEEL STRAPPING

TUBE FITTING CHART

An 8½ x 11" display card conveniently listing nomenclature for fourteen tube fitting shapes and five fitting parts, is available from The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio. Shapes are illustrated and described, with code designations for each in four types (Triple-lok 37° flared, Triple and Triple XX 30° flared and Ferulok flareless) in steel, stainless, brass and dural. Corresponding AN part numbers are also listed, and a chart relating tube size numbers with the tube OD's and pipe thread sizes is included.

SAFETY SHOE DISPLAYER



The illustration shows sturdy, easy-to-erect shoe display which the Hy-Test Safety Shoe Division of International Shoe Co., St. Louis, Mo., has designed to encourage workers and prospective wearers to handle and examine safety shoes for quality and lightness of weight, to make comparison of the different types and to select the shoe best suited to his job. The display is furnished free of charge to the company's customers on request.

DOUBLES LIFE OF BRUSHES AND COMMUTATORS IN HD MOTORS

A device which will more than double the life of brushes and commutators in series-wound, heavy duty motors has been developed by engineers of General Electric's Fractional Horsepower Motor Divisions. Designed for G-E fractional hp motors used in portable electric tools, the new brush stabilizing mechanism counteracts the wedging effect of the commutator and causes the brush to ride freely in the brush holder.

The device, engineers said, makes it possible to retain overload capacity of series motor parts and at the same time greatly increase brush life through the elimination of reflected vibration to the brush and the "wedging" of brush against brush holder by the force of the rotating commutator. The new mechanisms, they said, have been designed to interchange with standard mechanisms as outlined in the NEMA standardization of series-wound motor parts.

The G-E line of Type BA heavy-duty series motor parts will be available with and without the new mechanism. Special applications to other types of motors using a cartridge type mechanism also are expected.

(Please turn to page 190)

Packaging Is of Major Importance to You

It deserves your preferred attention and investigation . . . today as never before!

Packaging can be "Modern" or "Antique" . . . of real value in quality—in originality—in new uses that save production time . . . that eliminate production losses.

Cleveland Container representatives have the background . . . the knowledge of today's needs to make it worth your while to ask questions.

You'll obtain intelligent answers and information . . . possibly new ideas that may mean much to you.

May we serve you?

The CLEVELAND CONTAINER Co.

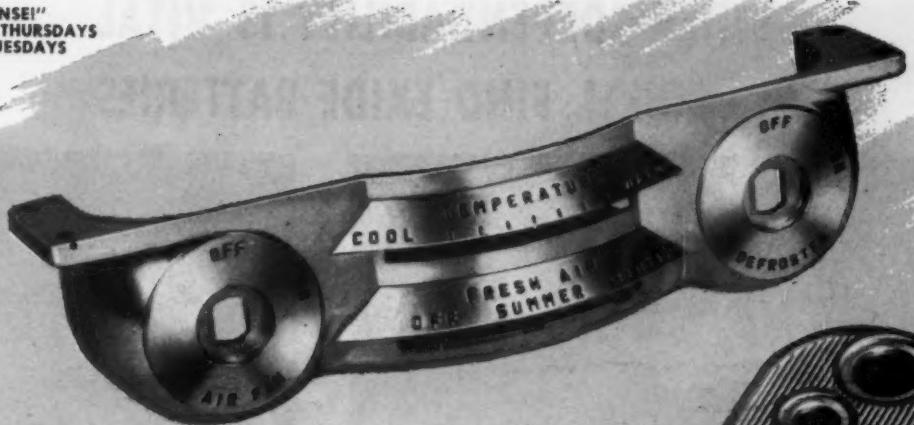
6201 BARBERTON AVE. CLEVELAND 2, OHIO

- All-Fibre Cans • Combination Metal and Paper Cans
- Spirally Wound Tubes and Cores for all Purposes
- Plastic and Combination Paper and Plastic Items

PRODUCTION PLANTS: at Plymouth, Wis., Ogallala, Neb., Chicago, Ill., Detroit, Mich., Jamestown, N. D.
PLASTICS DIVISION at Plymouth, Wis.; ABRASIVE DIVISION at Cleveland, Ohio
SALES OFFICES: Room 5632, Grand Central Terminal Building, New York 17, N. Y., also 847 Main St., Hartford, Conn.
CANADIAN PLANT: The Cleveland Container Canada, Ltd., Prescott, Ontario Sales Offices in Toronto and Montreal



TUNE IN "SUSPENSE!"
CBS RADIO NETWORK THURSDAYS
CBS TELEVISION TUESDAYS



AUTO-LITE

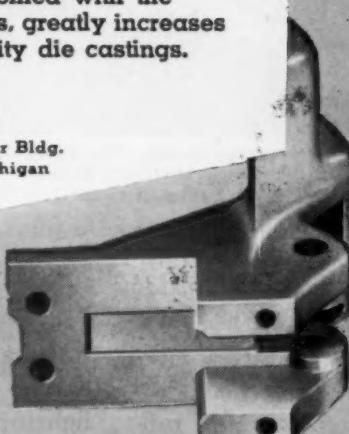
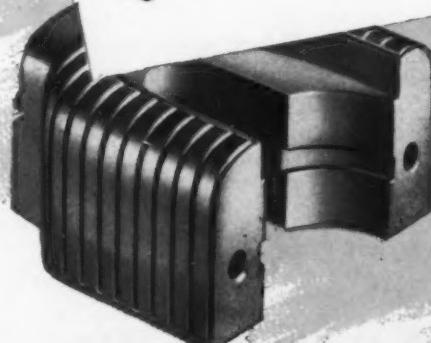
DIE CASTINGS

● Increased production facilities for die castings made possible through the famous Auto-Lite "controlled metals" processes are now available. The opening of the great new Lockland plant of Auto-Lite, combined with the enlarged facilities at Woodstock, Illinois, greatly increases Auto-Lite's ability to furnish high quality die castings.



THE ELECTRIC AUTO-LITE COMPANY
Die Casting Division, Woodstock, Illinois
600 S. Michigan Ave.
Chicago 5, Illinois

723 New Center Bldg.
Detroit 2, Michigan



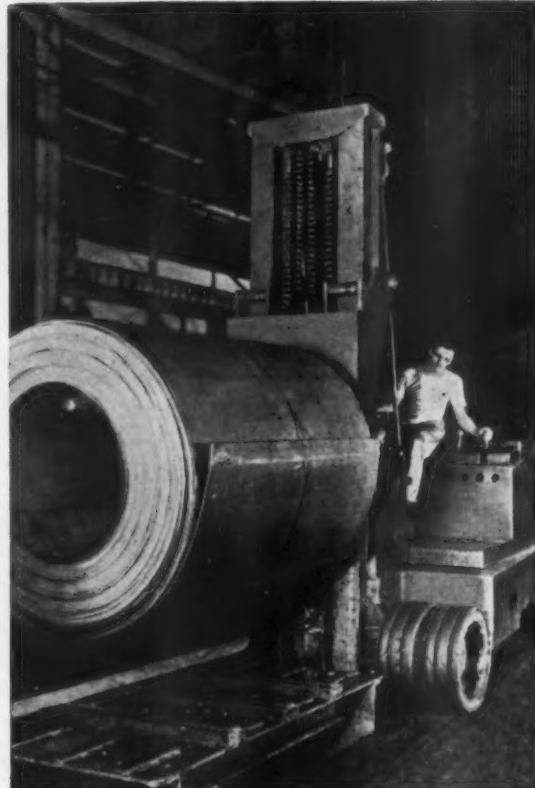
Inquiries invited

Catalog will be sent on request.
Write on your company letterhead.

WHERE DEPENDABILITY IS VITAL ...YOU'LL FIND EXIDE BATTERIES



DAILY BATTLE AGAINST DEATH. Human lives are saved each day by prompt, efficient ambulance service. Because battery dependability is extremely important, vast numbers of ambulances, police cars and fire apparatus are Exide equipped.



A MAN'S HAND MOVES ... 20,000 POUNDS OBEY. Battery electric trucks, with their "muscles" of steel, lift, haul and stack heavy loads with ease. Thousands of these time-saving, cost-cutting trucks are powered by Exide Batteries.



A "GUPPY", one of our latest submarines. The power that drives it when submerged is supplied by storage batteries. Many of the batteries used on U. S. Navy submarines are Exides. (Official U. S. Navy Photograph)



TELEPHONE ON WHEELS. Where mobile service is available, you can talk from your car to any telephone subscriber in the country. In cars and in receiving and transmitting stations, many Exide Batteries are used.

In numerous other ways, Exide Batteries are serving you. For there are dependable Exides to meet all storage battery needs. They provide battery power for railway car lighting, air conditioning, Diesel locomotive cranking, signal systems . . . ocean liners, fishing

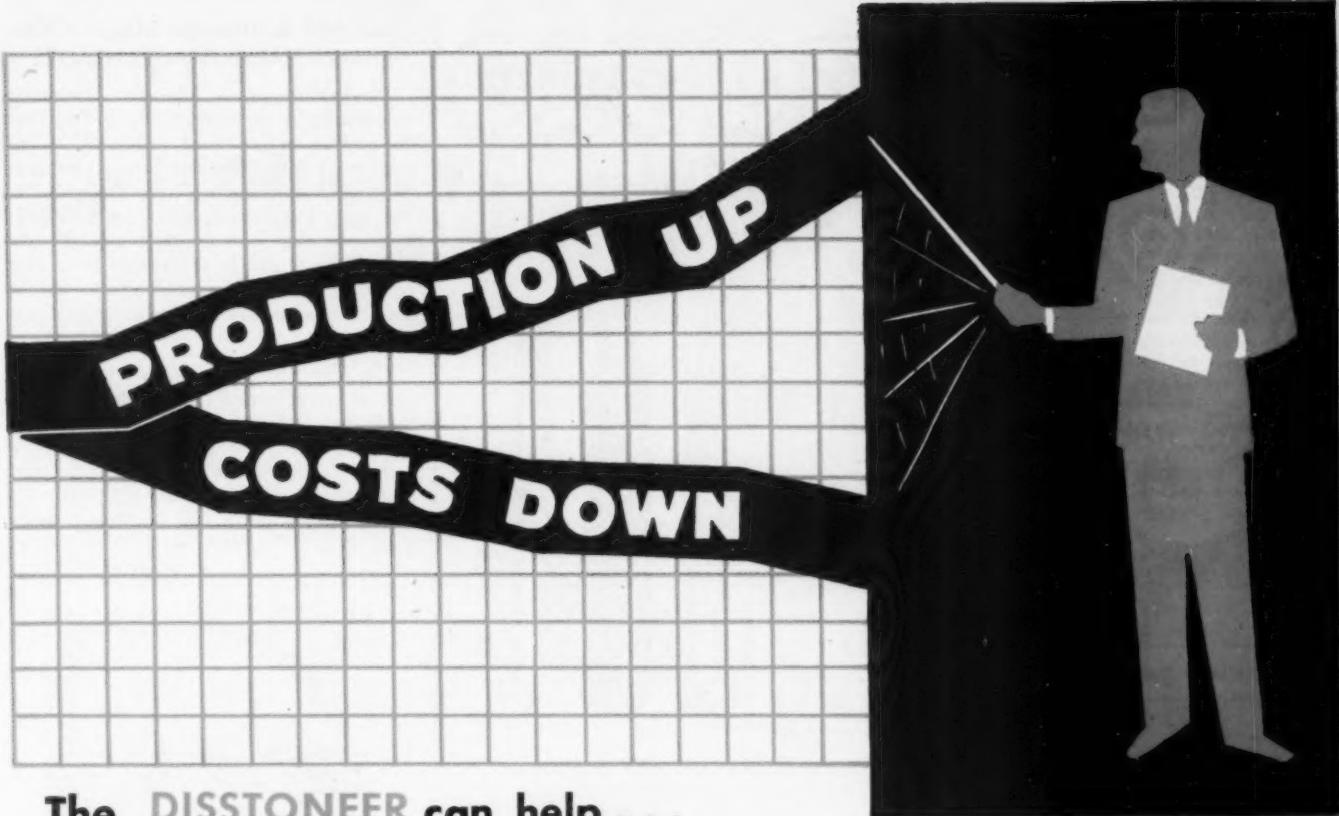
vessels, pleasure craft . . . radio and television stations . . . electric light and power plants . . . fire alarm systems and emergency lighting . . . many other vital services. And on millions of cars, trucks and buses, they daily prove that "When it's an Exide, you start."

Information regarding the application of storage batteries for any business or industrial need is available upon request.

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

Exide Reg. Trade-mark U. S. Pat. Off.

1888 . . . DEPENDABLE BATTERIES FOR 61 YEARS . . . 1949



The DISSTONEER can help . . .

LOWER YOUR "BREAK-EVEN" POINT

100% MORE KNIFE LIFE

Spaulding Lumber Co., Keysville, Va., cuts hardwood. Knives needed jointing every 2 hrs.—warped in grinding—lasted one 8-hr. shift between grinds. The Disstoneyer knew his Dissteel Thin Planer Knives. They last twice as long—cut out half the downtime—don't warp—do better work faster. A company official confirms all that, adding, "I have used various knives over a 25-year period. None can compare with Disston Dissteel thin knives."

**2½ to 3 hrs.
SAVED PER DAY**

A California foundry was getting only 15 aluminum alloy castings per band saw blade—and many rejects. A Disstoneyer studied the problem. His recommendations included use of Disston Buttress Tooth Pattern Flexback Blades. Production speed-up saved 2½ to 3 hours per day—at 50 castings per Disston Blade! . . . "I'm very well pleased with the change," says the user who had asked the Disstoneyer's help.

A Disstoneyer is a highly skilled specialist trained to help send your production levels UP and your cost levels DOWN. His ability to do this has been proved throughout industry, wherever economies can be achieved by improved, faster cutting of metals and woods.

The Disstoneyer comes through with sound suggestions and plans that work. He has the ability to make a practical analysis of your cutting problems. He actually "pipes in" to your plant all the accumulated Disston knowledge of cutting tools and their most efficient application. He tells you where Disston tools can help you save time and money, which Disston tools will save you most, and how they will do it best in your plant.

Consulting a Disstoneyer costs you nothing. You may easily save sizeable sums. This is on record. Hundreds of producers write that they have profited by the co-operation of a Disstoneyer. Read the typical case histories at the left. They indicate how much a Disstoneyer may accomplish for YOU.

HENRY DISSTON & SONS, INC.

93, Tacony, Philadelphia 35, Pa., U.S.A.

Canadian Factory: 2-20 Fraser Ave., Toronto 3, Ont.



DISSTON

ERIE SPECIAL BOLTING FOR HEAVY MACHINERY

FOR over 30 years ERIE has specialized in the manufacture of high quality bolting. We use the very latest equipment for heat treating, machining, grinding and threading. We are certain that we can produce better bolting at a saving to you because we are specialists — send us your bolting specification for our estimate.



for FARM EQUIPMENT

A DEPENDABLE SOURCE OF HIGH QUALITY BOLTING FOR RAILROADS, REFINERIES, DIESELS, FARM MACHINERY, EXCAVATING EQUIPMENT AND ALL TYPES OF HEAVY MACHINERY.

ERIE Bolt & Nut Co.
ERIE, PA.

A SUBSIDIARY OF
Barium
STEEL CORPORATION
Steelwright to the Nation

STUDS • BOLTS • NUTS ~ ~ ALLOYS • STAINLESS • CARBON • BRONZE
Representation in Principal Cities

THE RIGHT BALL



Let Strom Help You

Not only in precision ball bearings, but in countless other places, Strom has found that the right ball will do the job better. Maybe your problem can be solved with the use of the proper ball. Why not take it up with Strom.

Strom has been making precision

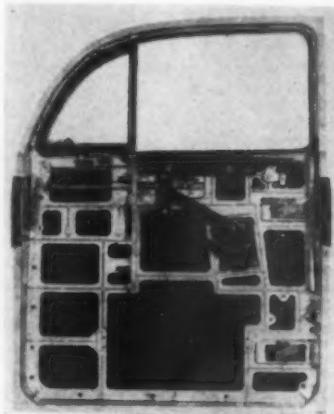
metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity and dependable physical quality, there's not a better ball made.

Strom STEEL BALL CO.
1850 So. 54th Ave., Cicero 50, Illinois
Largest Independent and Exclusive Metal Ball Manufacturer

DIE-CAST ALUMINUM AUTO DOOR OFFERS VARIOUS ADVANTAGES

Production of a die-cast aluminum automobile door, said to be the largest die casting in area ever produced, is announced by the Doehler-Jarvis Corporation, 385 Fourth Ave., New York, N. Y. The door has been designed in collaboration with engineers of the Kaiser-Frazer Corporation, and is the result of nearly two years of concentrated efforts on the part of design, die and metallurgical engineers.

The die casting, which is made of a special aluminum alloy, forms the structural base of the automobile door, to which the sheet steel outer panel is attached. It covers an overall dimensional area of approximately 1200 square inches (it is 43" x 33") and weighs slightly more than 12 pounds when trimmed.



The die casting covers an area of approximately 1200 square inches and weighs slightly more than 12 pounds when trimmed.

The die used in producing the door weighs approximately 13 tons, and the trimming die weighs more than four tons. Molten aluminum alloy used in making the door is "shot" into the steel die in something less than one-fifth second. The cast aluminum door reduces by approximately 35 pounds the weight of a four-door car.

The aluminum die casting enables the designer to make free use of reinforcing ribs which are difficult to obtain in sheet metal practice. It is also pointed out that because of the uniformity of the die cast frames, a substantial saving in assembly costs should result.

Speaking of the future possibilities of the die casting process as exemplified by the aluminum door, H. H. Doehler, chairman of the board of the corporation, termed "limitations" as "non-existent." "We recognize only the limitations of the designers' imagination", he said, adding that "applications in the manufacture of refrigerators, metal furniture, radio and television receivers, as well as many more automobile parts, are well within our vision."

(Please turn to page 194)

GLOBE

Offers You a Wide Choice in Stainless Steel Tubes



GLOBE
Seamless
STAINLESS STEEL TUBES



GLOWELD

Welded
STAINLESS STEEL TUBES



AVAILABLE
IN MORE THAN **26**
ANALYSES



For Your Product
or Process . . .
One of These Types
May Offer You
the Most In . . .

- Resistance to Corrosion
- Strength at High Temperatures
- Resistance to Oxidation at High Temperatures
- Ease of Fabrication



TYPICAL ANALYSES (In Per Cents)				
Type No.	Chromium	Nickel	Carbon	Other Elements
301	16-18	6-8	Over .08-.20	
302	17-19	8-10	Over .08-.20	
302B	17-19	8-10	Over .08-.20	
304	18-20	8-11	.08 max.	
308	19-21	10-12	.08 max.	
309	22-24	12-15	.20 max.	
309S	22-26	12-15	.08 max.	
309Cb	22-24	12-15	.10 max.	Cb 8xC min.
310	24-26	19-22	.25 max.	
314	23-26	19-22	.25 max.	Si 1.5-3
316	16-18	11-14	.08 max.	Mo 2-3
316Cb	16-18	10-14	.08 max.	Mo 2-3; Cb 8xC min.
317	18-20	11-14	.08 max.	Mo 3-4
321	17-20	9-13	.08 max.	Ti 5xC min.
329	23-28	2.5-5	.20 max.	Mo 1-2
330	14-16	33-36	.15 max.	
347	17-20	9-13	.08 max.	Cb 10 x C min.
403	11.5-13		.15 max.	
405	11.5-13.5		.08 max.	Al 10-30
410	11.5-13.5		.15 max.	
416	12-14		.15 max.	P, S, Se min. .07 Zr, Mo max. .60
430	14-18		.12 max.	
443	18-23		.20 max.	Cu .90-1.25
446	23-30		.20 max.	Ni .10-.25
Inconel*	11-15	70 min.		
Nichrome**	20	80		Fe 10 max.

*Registered U. S. Trade-Mark. **Trade-Mark Reg. U. S. Pat. Off.-D-H Co.

CHROMIUM, nickel, carbon, manganese, silicon, molybdenum, columbium, titanium — these and other elements, combined in various percentages, are the ingredients of stainless steel. Because varying analyses have widely varying service characteristics, Globe recommends a specific analysis or type only after carefully studying your particular problem. In addition to the above 26

standard types, Globe also furnishes special analyses.

You benefit from Globe's years of experience and research on stainless steel tubing problems. You are invited to take advantage of the extensive testing facilities in Globe's chemical, physical, and metallurgical laboratories and its staff of scientists and engineers.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin



Write for Bulletin 301 — Corrosion and Heat Resisting Steel Analyses Chart — a valuable reference tabulation of stainless steel analyses as produced by various manufacturers.

Seamless Stainless Steel Tubes — Gloweld Welded Stainless Steel Tubes — Carbon-Alloy-Seamless Steel Tubes — Globeiron Seamless High Purity Ingot Iron Tubes — Globe Welding Fittings



GLOBE
STEEL TUBES



HOW TO PREVENT *headaches* IN YOUR BRAIN CHILD

A new product involving the use of springs or formed wires can often cause a lot of headaches. But hundreds of manufacturers have saved themselves time, trouble and expense by taking our engineers into their confidence before the final design stage.

Our engineers analyze the proper relationship between the factors involved in a particular spring design . . . load, deflection, size, shape, finish, etc.

Then after they have designed a spring that will stand up under the service requirements demanded, our mill men take over. These skilled toolmakers (many of whom have been with us for over 25

years) build into the spring the craftsmanship that, for over 125 years, has been a Wickwire tradition.

Small wonder then, that our list of repeat customers is constantly growing. They have seen their brain children develop into sturdy products that have bounced their way into profitable sales fields. Why not make an appointment to see us about your spring problem? There is no obligation and it may erase a lot of worries on your part.

Send for our free book, "Springs and Formed Wires." It's full of valuable data about spring selection and performance.



WICKWIRE SPENCER SPRINGS

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION • THE COLORADO FUEL AND IRON CORPORATION

SPRING SALES OFFICE & PLANT—2 New Bond St., Worcester 6, Mass. • EXECUTIVE OFFICE—500 Fifth Ave., N. Y. 18, N. Y.

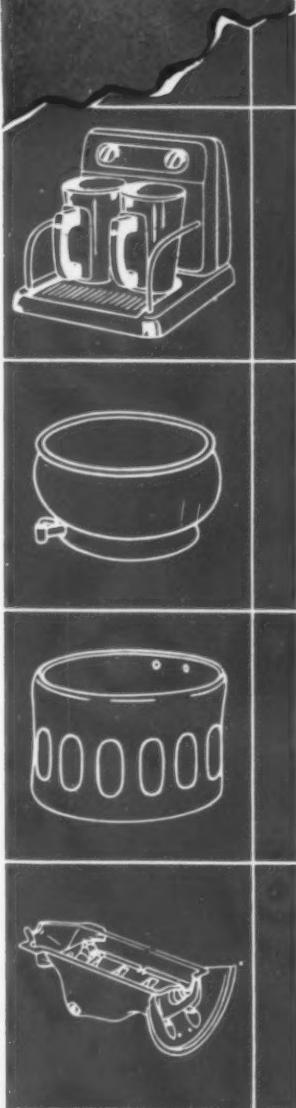
SALES OFFICES—Boston • Buffalo • Chicago • Denver • Detroit • New York • Philadelphia

PACIFIC COAST—The California Wire Cloth Corp., Oakland 6, Cal.

Other Quality Wickwire Spencer Products include: Wire, Wire Rope, Metal Conveyor Belts, Chain Link Fence, Industrial Wire Cloth, Poultry Netting, Hardware Cloth, Insect Wire Screening, Welded Wire Fabric for concrete reinforcement.



Cut Production Costs... Improve Your Product



MEMO

TO: Industry's Production Executives

FROM: Geuder, Paeschke and Frey Co.

It's possible for you to end many production headaches by using the overall metal processing facilities offered by G. P. & F.'s Complete Fabricating and Finishing Service. This includes:

1. Engineering—Designing
2. Stamping—Drawing—Forming
3. All Types of Welding
4. Tinning—Galvanizing—Lead Coating
5. Vitreous Enameling—Spray Painting

Add to your manufacturing profits by obtaining from a single source completed units—made to your specifications—finished—ready to assemble—or completely assembled.

Before expanding your production lines by adding costly equipment, investigate Geuder, Paeschke & Frey's capacity to design, fabricate and finish sheet metal products and product components for you.

G. P. & F.



**COMPLETE FABRICATING
AND FINISHING SERVICE**

GEUDER, PAESCHKE & FREY CO., 1520 W. ST. PAUL AVE., MILWAUKEE 3, WISCONSIN

BUSINESS IN MOTION

To our Colleagues in American Business . . .

Millions of small electric motors to run on six volts are required by the automotive industry for heaters, defrosters and ventilators in cars and trucks. One of the problems encountered in economical manufacture of reliable motors was found in the commutator, which is the part that feeds current to the windings of the rotating armature. It is necessary for the commutator to have high electrical conductivity; it must also be as hard as possible, consistent with very severe forming operations in an automatic, high-speed multi-slide machine. Hardness is desirable to resist wear by the motor brushes, and also to withstand the centrifugal force developed at high rotational speeds.

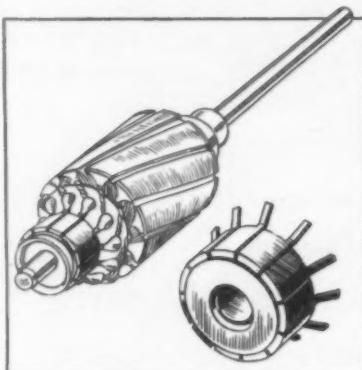
A manufacturer of these commutators came to Revere with these questions: which is the best material, and how hard could it be? Because of long experience with somewhat similar problems, Revere recommended trial of OFHC (Oxygen-Free High Conductivity) copper, four numbers hard. This was tested along with several other metals that seemed to possess at least some of the desired characteristics. The OFHC alone was found to produce excellent commutators, and with tolerances almost unbelievably close in this type of metal-working.

After the copper shells are formed, there is a plastic molding operation which requires the shell diameter to be held within .001", in order to prevent the plastic from flowing between the mold and the outer surfaces of the com-

mutator. For the same reason, an equal tolerance is imposed upon the height of the solid cylindrical portion. The plastic, which is tough and unusual in composition, serves both as insulation and as a mechanical connection between commutator and shaft without use of a bushing and key.

The success of this combination has been repeatedly demonstrated by tests. Speeds up to 35,000 r.p.m. have produced no failures in the commutators, though the rotor windings practically explode. At temperatures up to 400° F. there was no damage to the commutator, though the rotor wiring was badly damaged due to the combination of centrifugal force and decrease in wire strength. Thus once again the superior qualities of OFHC copper have been demonstrated.

Two things seem noteworthy in this case. First, the value of calling upon a supplier for not merely a product, but for his thorough knowledge of that product. Second, the fact that such knowledge makes possible new economy and reliability, even in combination with a totally different material. The supplier here happened to be Revere, and the materials are copper and a plastic. But the materials might have been anything, and the suppliers anybody, for throughout industry the skill and knowledge of sellers are freely available to buyers. All that is necessary for you to take advantage of them is to ask, and at the same time furnish complete information as to fabrication methods and conditions of use.



STORAGE RACKS INDOORS AND OUT FOR OIL DRUMS

The illustrations show how drums are compactly stored and easily removed by means of a storage rack system at the vast Sinclair Research Laboratories, Harvey, Ill. The drums contain samples of various materials and experimental products used in the permanently established program of Sinclair Refining Co. for creating better petroleum products.

As shown in the pictures, part of the storage racks, which have a total capacity of 300 drums, are located inside an enclosed building and the remainder outside. A portable elevator, shown, and a fork lift truck are employed to place the drums in the racks and for their removal.



Drum storage racks installed indoors and out at Sinclair Research Laboratories.

The design of the racks makes any drum immediately accessible when it is wanted. Material may be drawn from any drum without its removal from the rack, or disturbing other drums.

The racks are built of structural steel of adequate strength, with the panels or frames all-welded and with no punched holes to weaken the structure. As the racks come in 20-drum sections, the storage facilities can be increased, rearranged or moved.

The storage racks and portable elevator were made by Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Ill.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801



Executive Offices:

230 Park Avenue, New York 17, N. Y.

LOOKING FOR SOMETHING? . . .
PUT A "WANTED" AD IN
PURCHASING'S CLASSIFIED
SECTION! SEE PAGE 334

On thousands of applications in every field of manufacture, stepless variable speed operation assures exactly the right speed for every operation . . . for every operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a more uniform better quality product and more efficient performance of your equipment and your operators.

variable speed operation helps you

Master Speedrangers provide this infinitely variable speed in an all-metal, mechanical variable speed unit whose compactness and durability are extra features to help you make a good job better. And nowhere else will you find variable speed drives that are so flexible, so easily adaptable and in such a wide range of types and sizes.

For example, look at the controlled volume pumps shown below. The Speedranger, on the drive unit incorporates an explosion proof motor, a variable speed unit and a gear reduction . . . all standard Master units that easily combine into one compact, integral power package. This provides exactly the right speed, the right features, in a unit that you can mount right where you want it.

Probably you will not need this same combination of features. However, the next time you need a drive for material processing, handling, and conveying equipment; mixers and agitators; welding-positioners; machine tool drives; testing and calibrating equipment . . . to name only a few . . . see what a really remarkable job Master Speedrangers can do for you. Write for Data 7525, new twenty-four page booklet on Speedrangers.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

especially when you use

MASTER SPEEDRANGERS

**make a
good job better**



***CONQUER** those Handling Costs! . . . as the quickest, surest way to bring down unreasonably high production **COSTS!**

To find and realize your opportunities for *big savings* in this incomparably rich field,

***CONSULT** the leading producer of modern handling methods and machines . . . **CLARK**



How a great many leading businesses are conquering costs—with quick and substantial profit to themselves—is described and illustrated in Material Handling News and in Clark's invaluable motion pictures. You can enjoy the benefits of both by requesting them on your business letterhead.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS

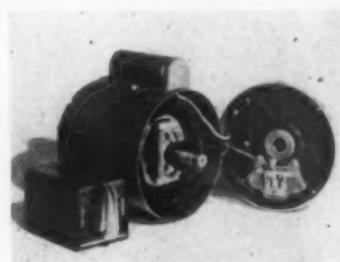
Four detailed line drawings of different types of industrial trucks produced by Clark. From left to right: a side-loading truck with a large bin; a tow tractor with a flatbed trailer; a forklift truck; and another tow tractor with a different attachment.

INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT COMPANY BATTLE CREEK 23, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS
THE NATIONAL GUARD DEFENDS AMERICA—JOIN NOW!

ECONOMICAL REVERSING SWITCH FOR SINGLE PHASE MOTORS

Single-phase motors have the reversing characteristics of three-phase motors when equipped with the Reverswitch, new product of the Iron Fireman Manufacturing Co., Portland, Oregon. The new switch gives split-phase and capacitor-start motors the ability to be started in either direction, reversed instantly, or brought to a quick stop. It replaces the starting switch in motors with centrifugal starting mechanisms and is said to fit most standard fractional-horsepower motors. Its action is mechanical, being similar to conventional starting switches except that it has two contacts instead of the usual one. Its life is said to be comparable to that of other starting switches.



New Reverswitch in bell of motor with control

The Reverswitch can be used as an ordinary starting switch to give simple one-direction starting, and in this capacity it will give long and dependable service. To achieve instant reversing some type of external controller is necessary. Basically, the action of a three-pole double-throw switch with an off position is required. Various types of standard starting and reversing switches, drum controllers, and magnetic relays may be used, making a wide selection of both manual and automatic methods of control readily available.

STEEL SHOT FOR BLAST CLEANING EQUIPMENT

Announcement is made by the American Wheelablator & Equipment Corp., Mishawaka, Ind., of Tru-Steel shot for use in all types of blast cleaning equipment. The new material is said to have a much longer useful life than that of chilled iron, consequently there is less to buy, store and transport. It wears down, rather than breaks down, and its use is said to result in greatly reduced wear on blast cleaning equipment. In a heat descaling job only 2.73 lbs. of the steel shot were used per wheel hour in 476 hours; no wheel parts needed replacement. A reduction of 15 lbs. of chilled iron shot per wheel hour to 1.5 lb. of steel shot was effected in cleaning gray iron castings. In a shot peening operation only 15.66 lbs. of the shot were used per wheel hour compared with 79.99 lbs. of chilled iron shot. Printed matter available.

(Please turn to page 201)



*"For years I've bought
machines of this type...
but this is the first
one I ever could
COUNT ON!"*

Give your customers (and customers-you-hope) the thrill of discovery . . . of discovering something new in your product . . . something that gives them new advantages in use . . . new pride of ownership . . . renewed respect for you as a modern merchandiser!

How? Build a Veeder-Root Counter into your product. But what kind of counter, and how to build it in? Those are questions that a Veeder-Root engineer will answer promptly and squarely . . . if you let him concentrate his "mathematical eye" on your product.

And why let him do that? Because there are so many types of Veeder-Root Mechanical and Electrical Counters . . . and because so many of the most successful applications were not apparent

at first, at all. Now, couldn't you profit more by having your product keep its own production records, prove its own service guarantee, protect customers against shortages and surpluses . . . or provide any of the many other new advantages that come with built-in Veeder-Root Control? It costs exactly 3 cents to find out. Write.

No. 1122 V-R Small Reset Ratchet Counter is built into a wide range of products from addressing machines and aerial cameras to hay balers, laundry machines, linotypes, shoe machinery, machine tools and — what have you? For a quick picture of the range of V-R Counters, send for free 8-page Condensed Catalog (shown). Write now.



Veeder-Root **COUNTERS**

VEEDER-ROOT INC., HARTFORD 2, CONNECTICUT

In Canada: Veeder-Root of Canada, Ltd., 955 St. James Street, Montreal 3. In Great Britain: Veeder-Root Ltd., Kilspindie Road, Dundee, Scotland.

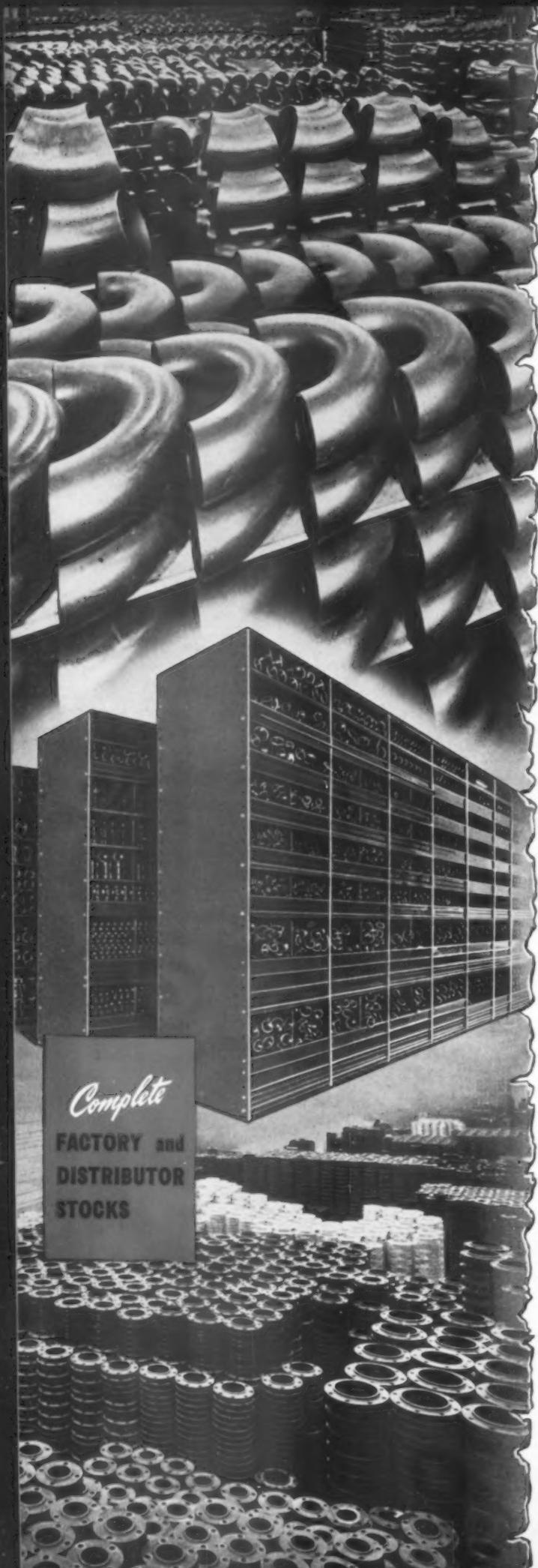
all
three
on one
order
from
Ladish



TO MARK PROGRESS

every piping system deserves the protection

Complete
FACTORY and
DISTRIBUTOR
STOCKS



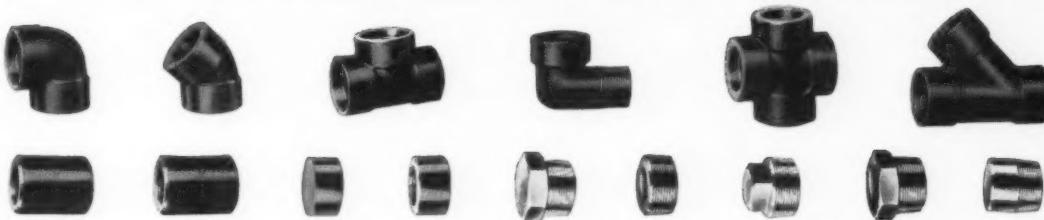
SEAMLESS WELDING FITTINGS—1/2 INCH THRU 30 INCHES



FORGED STEEL FLANGES—1/2 INCH THRU 30 INCHES—LARGE O.D. THRU 96 INCHES



FORGED STEEL FITTINGS—SCREWED AND SOCKET WELDING—1/8 INCH THRU 4 INCHES



Means savings in time and dollars...for LADISH offers you a complete line backed with adequate stocks

Whatever your fitting requirements...you can rely on the Ladish line for an unrestricted selection of Seamless Welding Fittings, Forged Steel Flanges and Forged Steel Fittings.

This Controlled Quality line is complete in types, size ranges and materials you need for virtually any application. Ladish also gives you such outstanding engineering developments to improve piping efficiency, as Seamless Reducing Elbows and Full Branch Taper Design Tees.

Adequate stocks in strategically located distributor warehouses...supplemented by extensive factory inventories of every type...

All Available in
CARBON
ALLOY
STAINLESS STEELS
ALUMINUM
COPPER & OTHER
NON-FERROUS
METALS

give you double assurance of prompt service on every Ladish order. And, by standardizing on Ladish you know that every fitting is made to the unsurpassed standards of Controlled Quality for complete dependability.

A COMPLETE LINE PRODUCED UNDER ONE ROOF
...ONE RESPONSIBILITY



LADISH CO.

CUDAHY, WISCONSIN

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of *Controlled Quality* fittings

**WHY IT
PAYS TO BUY**

Riegel
WORK GLOVES



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STYLING FOR COMFORT
LONGER WEAR
SEALED CONTAINERS
PRECISION MADE
BETTER VALUES
**UNCONDITIONALLY
GUARANTEED**

We believe Riegel Work Gloves are the best you can buy... comfortable, long wearing and economical...qualities made possible by complete control, in a single plant, of every step from the raw cotton to the finished glove. No other glove is made in this manner.

Quality Control is just one of many good reasons why it will pay you to buy Riegel Work Gloves. To get the rest of the story, write for our complete free catalog. It shows you how Riegel Gloves are made...with detailed photographs and exact specifications on our entire line. Write to

RIEGEL TEXTILE CORP., 342 MADISON AVE., NEW YORK 17, N.Y.



Riegel
WORK GLOVES

**NEW ALLOY CAST STEEL PERFECTED
FOR USE AT 423 DEGREES
BELOW ZERO**

Development of a new alloy steel capable of fulfilling extraordinary engineering requirements of sub-zero service at operating temperatures as low as —423 degrees Fahrenheit, was announced recently by Lebanon Steel Foundry, Lebanon, Pa.

An austenitic cast ferrous alloy containing 19.50 per cent chromium and 9 per cent nickel, among other alloying constituents, the versatile alloy steel identified as Lebanon Grade 22 is believed to have particular usefulness for application in meeting exacting requirements of the oil, chemical and other processing industries. It already has been used effectively in the production of steel castings for pressure equipment in storage facilities for liquid oxygen used as a propellant for rocket engines. Such storage is maintained under high pressures at temperatures of approximately 298 degrees below zero. Portending are other applications in various restricted ordnance fields.

The new alloy cast steel, according to William H. Worrillow, Lebanon president, has shown no structural changes down to —423 degrees in hundreds of testing laboratory impact tests from production lots of (L)-22 castings, and the same cumulative tests have indicated appreciable increase in hardness directly proportional to the decrease in temperatures.

An added factor of engineering importance to designers and product development engineers, Mr. Worrillow said, is the fact that tensile strength of the particular cast austenitic alloy varies inversely with temperature, and in direct relationship with hardness. Ductility is lowered somewhat, but not in proportion to the increase of tensile strength, which is estimated to be approximately 200,000 pounds per square inch at —423 degrees, with retention of adequate strength factors and resistance to embrittlement.

Also significant, he said, is that the alloy may be easily welded by either gas or electric processes without need for subsequent heat treatment, since low temperatures do not seriously impair the welded impact resistance.

"The excellent welding characteristics of the sub-zero cast alloy offers the maximum degree of flexibility to the designer and fabricator of equipment at extremely low temperatures," Mr. Worrillow said. "No embrittlement from low temperature has been noted in the cast alloy or from welds or adjacent fusion zones made from the same composition, nor has any transition zone been noted in test work covering hundreds of production heats."

Paradoxically, the same (L)-22 alloy adapted for sub-zero service also is being used successfully in engineering applications calling for exacting heat-resistant characteristics at extremely high operating temperatures, as in the instance of some jet-engine components, turbo-supercharger parts, and other gas turbine uses.

(Please turn to page 202)



EMBLEM OF QUALITY

DAMPER CONTROL MOTORS

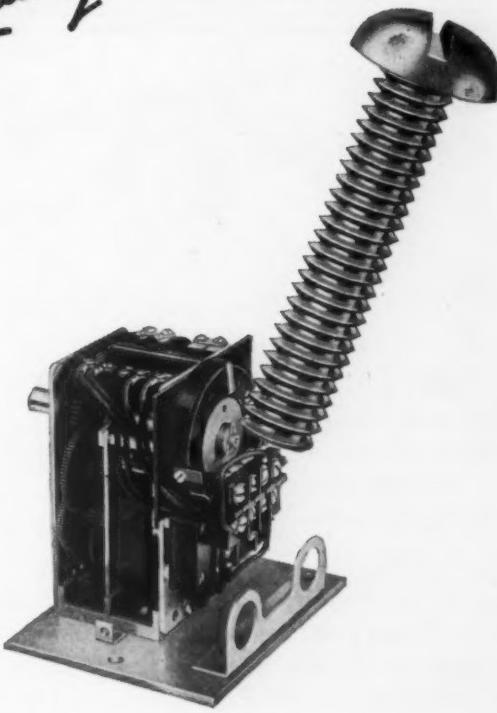
"Quick starting threads, perfectly centered slots, no off-center heads—." It's an old story, but mighty important on operations requiring assembly of screw fasteners . . . for these features save countless delays and extra costs in starting and driving screws.

They are features which protect reputations for quality and long service, too. For example, these damper control motors are widely known for service and dependability. In assembly, there must be no risk of poor connections due to loose fitting threads, shorts caused by off-center heads, or screw threads which jam before they get there.

Elco screws are made under rigid production control to give this kind of dependability. You will find a new experience in trouble-free fastening if you specify Elco Screws on your next order.

Write for Catalog No. 48.

Quality features ELCO screws



ELCO TOOL AND SCREW CORPORATION

1912 BROADWAY ROCKFORD, ILLINOIS

WOOD SCREWS • MACHINE SCREWS • MACHINE SCREW NUTS
DRIVE SCREWS • CAP SCREWS • LAG SCREWS • SPECIAL SCREWS
TAPPING SCREWS • STOVE BOLTS • PIPE PLUGS

JUST PRINTED

Two bulletins showing how
NEW G-E MOTOR EXCHANGE PLAN
cuts machine down time

Get the story of the new time and money saving General Electric exchange plan for Tri-Clad integral-hp motors! It's an extension of the highly successful G-E fractional-hp motor exchange plan and covers most popular types of Tri-Clad open dripproof motors—one to five hp. Bulletin GEA-5189 is for motor users; Bulletin GEA-5180 is for machinery manufacturers. Write on your letterhead FOR FREE COPY: Apparatus Department, General Electric Company, Schenectady 5, N. Y.

Look for this extra on the motors you buy; it means lower maintenance costs, less time lost for motor replacement.



GENERAL  **ELECTRIC**



Buy Springs on "Performance"

THINK twice about springs. Spring failure is usually product failure (in the customer's hands)! Perfect spring performance sidetracks many of the headaches in launching new machines, appliances, gadgets—protects your good name.

If you have any doubts about the "trustworthiness" of the springs you use or plan to use, we'll be most glad to have our engineers check your blue prints without obligation and share with you a spring making experience of 25 years' standing. This service also goes for Peck Screw Machine Products. Let us hear from you, please.

PECK

SPRINGS & SCREW MACHINE PRODUCTS
THE PECK SPRING COMPANY 40 Wells St., Plainville, Conn.

PACKAGING & MATERIALS HANDLING EXPOSITION AT DETROIT

The fourth annual Industrial Packaging and Materials Exposition will be held in Detroit, in Convention Hall, October 4, 5 and 6. C. J. Carney, managing director anticipates a total attendance at the exposition and sessions of over 7000 people.

The 1949 exposition includes active cooperation by Wayne University in Detroit. This will include 16 specialized discussion sessions, lecture sessions and panels scheduled for October 3 through October 7.

Complete information and registration blanks are obtainable from the Society of Industrial Packaging and Materials Handling Engineers, 20 W. Jackson Boulevard, Chicago, Ill.

1 1 1

UNIFIED SCREW THREAD STANDARDS NEW PUBLICATION

An accord for unification of American, British, and Canadian standard systems of screw threads was signed at the National Bureau of Standards on November 18, 1948. The proceedings of this meeting together with detailed illustrations, tables, and numerical data setting forth standards of thread form are presented in a new booklet, *Unified Screw Thread Standards*, recently published by the Bureau and now available from the U. S. Government Printing Office.

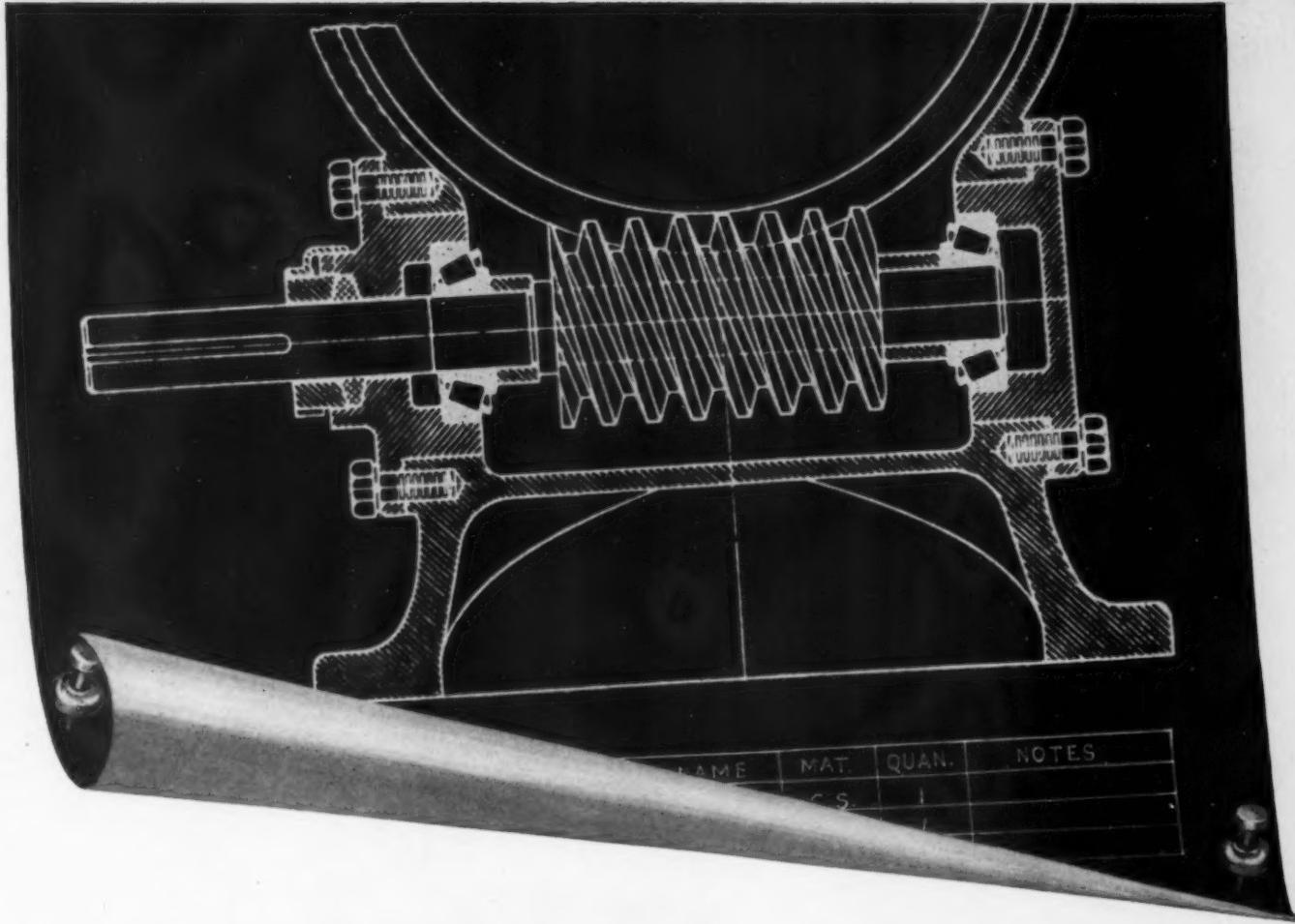
In the past, international trade in mechanical equipment of all kinds has been seriously handicapped by the lack of interchangeability of screw thread parts. Manufacturers have been forced to supply and distribute these parts along with equipment marketed in a foreign area, a factor which has acted as a deterrent to those purchasing products from other nations. The adoption of these unified screw thread standards will remove an important barrier to the exchange of manufactured goods throughout the world.

Specifications of Agreement

The present unification agreement provides a 60-degree angle and a rounded root for screw threads with either flat or rounded external thread crests. The number of threads per inch for the various series of thread diameters has been unified, and the limiting dimensions for three grades to fit have been agreed upon. Thus, interchangeability of screw thread parts, based on the accord, now becomes feasible.

Circular 479, *Unified Screw Thread Standards*, 27 large double column pages, adequately illustrated with tables and figures, 30 cents a copy, available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Remittances from foreign countries must be in United States exchange and must include an additional sum of one-third the publication price to cover mailing costs.

(Please turn to page 204)



How to make your product do more work with less play

YOUR product does its job more efficiently and lasts longer when every rotating shaft is mounted on Timken® tapered roller bearings.

Timken bearings hold shafts in true alignment, prevent shaft deflection and end-play, keep gears meshing smoothly. Due to their tapered construction, Timken tapered roller bearings take any combination of radial and thrust loads. Special thrust bearings or washers are unnecessary. Design can be simplified—space saved.

Timken bearings are manufactured to extreme precision. Their true rolling motion practically eliminates friction on moving parts. Line contact between

the rolls and races provides maximum load-carrying capacity.

Made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel—Timken bearings last the life of the machine in which they are used.

No other bearing can bring you *all* the advantages you get with Timken bearings—backed by fifty years of research and development. Make them standard in all the machinery you buy or build. And look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

50th birthday of the company whose products you know by the trade-mark: TIMKEN



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



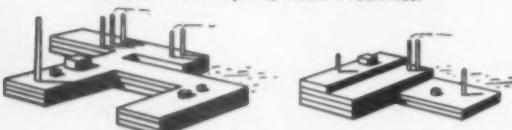
Your "shipping dollar" goes farther with American Boxes and Crates

You can't safely count your profits until your product is delivered! That's why American Box Co. engineers and technicians have devoted 48 years exclusively to the development of improved boxes and crates that do a bigger, better job, for less money.

The result: Today you can depend on American for unexcelled box-making service—"engineered" to fulfill your specific requirements for size, shape, strength, weather conditions, handling, quantity, etc.; yet carefully planned to give you every advantage of economy in materials, and modern, efficient manufacturing processes. How can you be sure you're getting the most for your "shipping dollar", until you've tried American? Complete details promptly at your request. No obligation.

TWO GREAT PLANTS (Est. 1901)

Located for easy access to all box-making needs. Main plant in Cleveland, Ohio, branch plant in Marion, S. C., feature most complete, modern facilities.

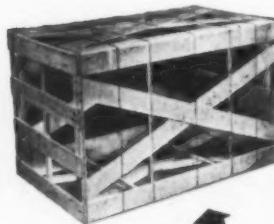


THE American BOX CO.

1901 W. 3rd Street • Phone: MAin 4221 • Cleveland 13, Ohio
Branch Plant: Marion, S. C.

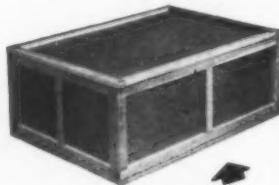
ALL-BOUND BOX

Wood veneer panels, steel wirebound for strength. Completely enclosed. Protects contents from weather, dirt. Supplied flat for easy assembly.



WIREBOUND CRATE

Strength-tested, lightweight. Built-in support features. Easy handling, stacks well. Supplied flat for wrap-around assembly.



FIBREBOARD BOX

Attractive, low-cost. Fully enclosed, panels steel stapled to wood cleats. Superior reinforcements. Supplied flat for easy assembly.



NAILED WOOD BOX

Materials and workmanship to meet or surpass Government Specifications for domestic or export shipments.

ONE INDUSTRIAL LIFT TRUCK SOLVES MATERIAL HANDLING PROBLEM

Towmotor Corporation, manufacturer of fork lift trucks, tractors, and fork lift truck accessories has just published another one of its on-the-spot job studies which have done so much to enlighten industry regarding the economy and efficiency to be obtained in materials handling through the use of lift trucks and tractors.

This new Towmotor Job Study is number 84 of the series and deals with the Clinton, Iowa plant of Curtis Companies, Inc., manufacturer of door sashes, interior trim, moulding, and panel work. It details the materials handling problem as it existed before the arrival of the lift truck at the plant and how its advent solved it. Lumber yard owners, sash and door manufacturers, and those engaged in other millwork operations will be particularly interested in the remarkable savings achieved in the handling of lumber, speeding up of production and deliveries.

You may secure a copy of Towmotor Job Study #84 by writing to Towmotor Corporation, 1226 E. 152nd Street, Cleveland 10, Ohio.



NEW LEAD-BEARING, FREE-MACHINING SCREW STOCK

A new lead-bearing, cold-finished steel bar, to be known as La-Led Free-Machining Screw Stock, is now being offered by LaSalle Steel Company, Chicago. Actual tests show that the new bar provides from 44% to as high as 106% better machinability than regular B-1113 stock, and it machines to a fine, satiny finish.

As contrasted with other recently announced free-machining stocks, which are made of Bessemer steel, La-Led is an open-hearth steel. As such, it has good ductility properties, permitting bending and crimping operations. It also will carburize better and have a sounder cross section than Bessemer steel free-machining stock.

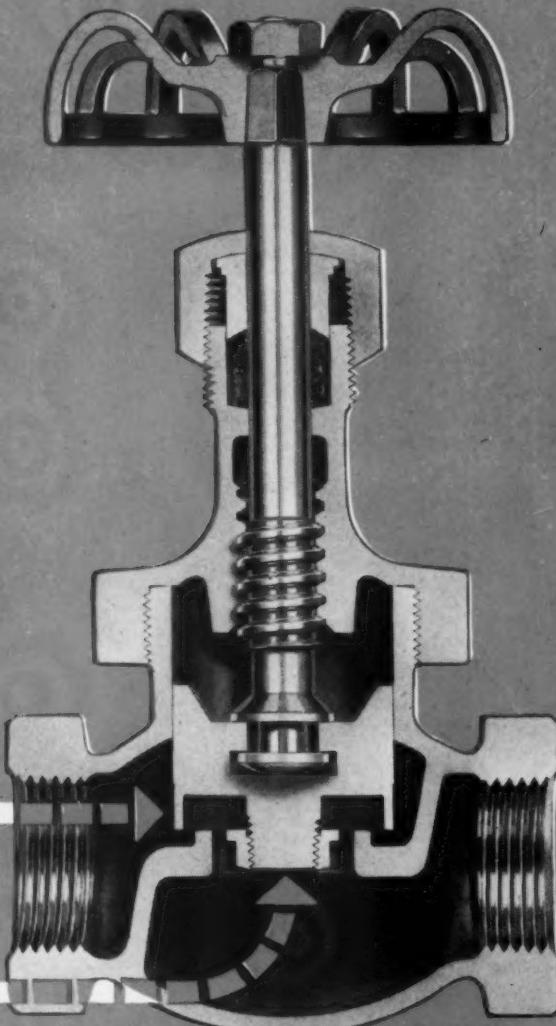
Studies have shown that lead-bearing steels have a much lower friction component in machining than the same steel without lead. This lower friction between the tool face and the chip being removed helps to keep the cutting edge of the tool from overheating and failing. The phosphorus and sulphur contents of La-Led also aid its machinability. This combination of chemistry and cold drawing is claimed to make the fastest machining steel ever produced.

Well over a thousand tons of round and hexagon stock have already been used in production testing. In six particular cases involving drilling, forming, and tapping operations, production increases due to faster machining have been from 44% to 106%.

La-Led is available on normal mill delivery in 5/16" through 3" rounds and in the popular hexagon sizes.

(Please turn to page 208)

ARE VALVES THROTTLING YOUR PIPELINES HERE AND HERE?



Globe Valves, by their very design, provide some resistance to flow. But valves with undersized ports and discs without full lift can increase this resistance to the throttling point.

1 The full lift of the renewable disc gives a flow area capable of handling the maximum flow of the pipe. By clearing the flow path, both turbulence and resistance are kept at a minimum. You don't throttle your line here.

2 The full-sized, smooth-machined port of O-B's No. 11 Outside Bonnet composition disc valve matches pipe diameter exactly. You don't lose any flow capacity here.

You'll get long-wearing service plus minimum flow resistance with O-B's No. 11. On your next order for 150-lb. W.S.P.--300-lb. W.O.G. valves, specify the No. 11 from your local Ohio Brass distributor.

OHIO BRASS COMPANY, Mansfield, O.

3000-V

Ohio Brass  **VALVES**

FOR DOMESTIC AND

INDUSTRIAL USE

DEAD SOFT... AND EASY ON YOUR WIRE WORKING MACHINES



Steel with this grain structure resists forming and is tough on wire working tools and dies.

Spheroidizing changes the free cementite in steel from elongated shapes to small nodules or spheroids thus rendering the steel soft and ductile.

Here's a wire that is really friendly to forming dies and wire working machines. It's dead soft . . . takes severe bends beautifully . . . is easy to cut, swage, grind and polish. After forming, its temper or hardness can be restored.

Because of these characteristics, Wissco Spheroidized Wire is ideally suited for making screw drivers, awls, ice-picks, parts of toys and other products the manufacture of which calls for severe wire forming.

The secret of the superiority of Wissco Spheroidized Wire lies in the use of specially selected heats of steel and exacting control of the heat treating operation to insure complete and uniform heating of each batch of wire.

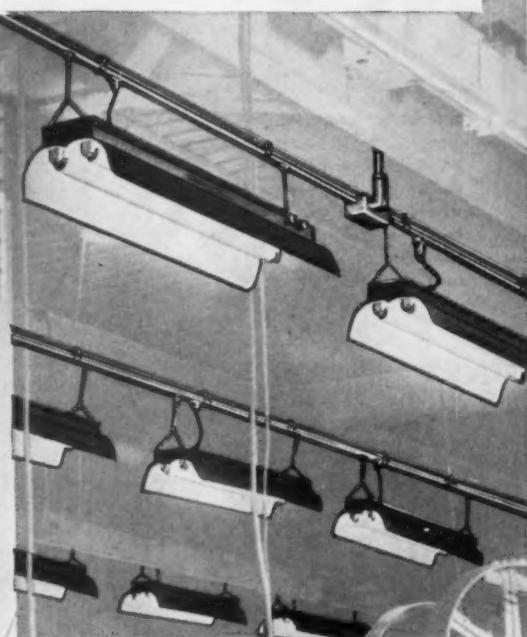
If you want further information on Wissco Spheroidized, or any of Wickwire Spencer's innumerable types of high or low carbon steel specialty wires, won't you write us? Our metallurgists have a reputation for finding the answers to unusual wire applications.

WISSCO *Wire*
A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION - THE COLORADO FUEL AND IRON CORPORATION
WIRE SALES OFFICE — 361 DELAWARE AVE., BUFFALO 2, N. Y.
EXECUTIVE OFFICE — 500 FIFTH AVE., NEW YORK 18, N. Y.
SALES OFFICES — BOSTON · CHICAGO · DENVER · DETROIT · NEW YORK · PHILADELPHIA
PACIFIC COAST SUBSIDIARY — THE CALIFORNIA WIRE CLOTH CORP., OAKLAND 6, CAL.

CF&I



Slotted BullDog Universal Trol-E-Duct both supports and supplies current to these fluorescent lighting fixtures. BullDog manufactures Vacu-Break Safety Switches • SafeToFuse Panelboards • Superba and Rocker Type Panelboards • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution Duct • "Plug-In" BUStribution Duct • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.



Spot your lighting with a slot

TIRED of rewiring the whole plant every time you move or add a lighting fixture?

Let the continuous outlet slot of BullDog Universal Trol-E-Duct spot your lighting fixtures where you want them.

Universal Trol-E-Duct gives truly flexible lighting. Trol-E-Duct's slot makes it possible to add, remove or change lighting fixtures at will . . . without rewiring.

Twist-out plugs or trolleys tap current from the slotted opening which runs the full length of the

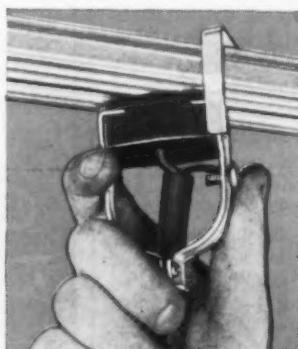
Trol-E-Duct. They can be quickly attached or removed without disconnecting the current.

Prefabricated and standardized, Universal Trol-E-Duct is made in lengths from one to ten feet. It can be dismantled and reinstalled at any time, without scrapping a single part. Systems can be easily expanded by adding standard sections and fittings. Capacity: 50 Amps., 250 Volts, Single Phase.

Call in your BullDog Field Engineer for more information on this modern lighting system. He will be glad to show you a typical installation nearby.



For a mobile light source, use a trolley outlet. Easily inserted at a Trolley Entrance Coupling. Metal wheels roll smoothly astride duct slot. Contacts are in constant touch with bus bars as trolley moves.



Inserting a twist-out plug in Universal Trol-E-Duct is easy! Simply insert plug contacts in slotted opening of duct and give plug a quarter-turn. "L" supports lock plug firmly in place.

BullDog Field Engineers welcome the opportunity to sit in with you during the early planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation costs, as well as efficiency and reliability in actual operation. Why not take advantage of this service?

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

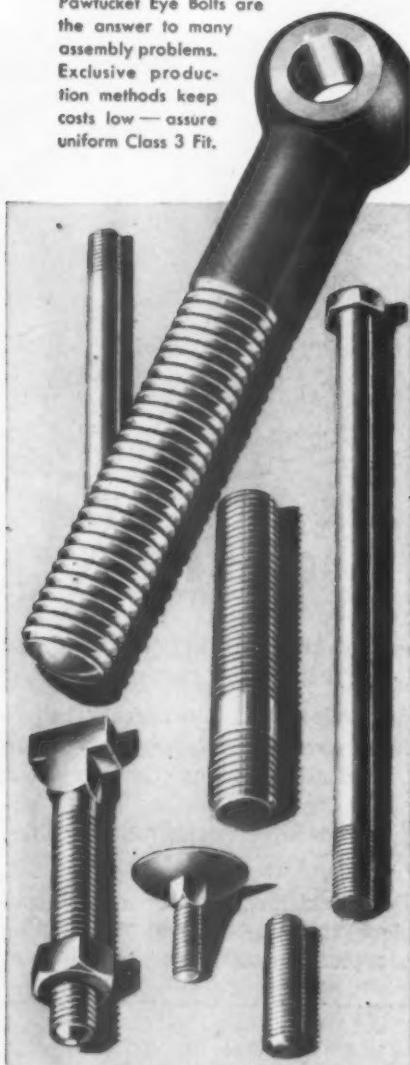


BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

Looking for specialties EYE BOLTS

Accurately made in sizes $\frac{1}{4}$ " and larger, or to your specifications, Pawtucket Eye Bolts are the answer to many assembly problems. Exclusive production methods keep costs low — assure uniform Class 3 Fit.



BETTER BOLTS SINCE 1882

Use Headed and Threaded Fasteners for Economy and Reliability

PAWTUCKET

"THE BOLT MAN"
MANUFACTURING COMPANY

327 Pine Street · Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

NEW MOTOR EXCHANGE PLAN ANNOUNCED BY WESTINGHOUSE

Westinghouse announces its new Motor Exchange Plan for single-phase and three-phase, 1 to 20 horsepower, frame 203 to 32C, a-c motors.

This Motor Exchange Plan is designed to minimize the inconvenience if motor failures occur—to get another motor on the job promptly with the least possible loss of productive time.

Stocks of replacement motors are maintained at Westinghouse warehouses, throughout the U.S.A. If a motor fails it may be exchanged immediately for a motor of identical rating.

Types of Exchange and General Regulations

Westinghouse Type CSP Life-Line three-phase motors, 1 to 20 hp, and Type CAP Life-Line single-phase motors, 1 to $7\frac{1}{2}$ hp, may qualify for either Class I, Class II, or Class III exchange.

Class I Exchange

The motor which is returned has failed under conditions constituting a breach of warranty. No charge will be made for the replacement motor.

Class II Exchange

The motor which is returned has failed outside of warranty, and requires such major repairs as a new commutator, complete re-wind, replacement of broken major parts, etc. A flat charge is made at considerable savings over a new motor.

Class III Exchange

The motor which is returned has failed outside of warranty, and requires only minor repairs such as replacement of bearings, capacitor, Thermoguard, relay or switch. A small charge is made for the replacement motor.

For further information write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh, Pennsylvania.

BOOKLET TELLS ABOUT ADVANTAGES OF STEEL CASTINGS

The substantial savings made possible by the use of steel castings are emphasized in a new illustrated booklet published by the Steel Founders' Society of America, 920 Midland building, Cleveland, Ohio. The booklet is intended to serve especially as a guide to executives faced with the necessity of paring costs. The title of the booklet is "The Steel Castings Industry", and copy is available upon request. A considerable portion of it comprises word and picture descriptions of steel castings used to solve specific problems and meet critical, general requirements of various industries. Instances in which designers specifying steel castings were enabled to cut weight as much as 15% and at the same time reduce production costs as much as 18%, plus elimination of failures in service, are given graphic treatment. Of particular value is new tabulation of the general engineering types of steel castings, classified according to tensile strengths. Purchasing Agents should find this book of particular interest.

(Please turn to page 210)



FORGINGS AND STAMPINGS

DIXISTEEL forgings and stampings are made of carefully analyzed steel produced in our own open hearth furnaces. They are of highest quality and strength.

Send us your prints or specifications for forged or stamped parts, and we will be pleased to submit our estimate for production.

ATLANTIC STEEL COMPANY
P.O. BOX 1714 DIXISTEEL ATLANTA, GEORGIA

YOU'LL FIND CHEMICALS FOR EVERYTHING FROM FERTILIZERS TO PHARMACEUTICALS

O P D

- The whole week's round-up of Chemical News
- 5000-6000 Quotations
- 2957 Pages of Chemicals Advertising last year

New forms close 4 P.M. Friday
Paper delivered 9 A.M. Monday

May we send you a sample copy of O.P.D.?



Oil, Paint and Drug Reporter

For Chemical Buyers
The Market Authority since 1871

SCHNELL PUBLISHING CO., INC.

59 John Street, New York 7

- Cleveland 22 — H. G. Seed, 17717 Lorond Blvd., Long 0344 • Los Angeles 14 — The Robt. W. Walker Co., 684 S. Lafayette Park Pl., Drexel 4338
- San Francisco 4 — The Robt. W. Walker Co., 68 Post Street, Sutter 1-3568.

NEW HELPFUL GUIDE



to gas regulating problems

This new Airco Regulator catalog gives authentic, understandable information on the function and operating characteristics of regulators for the following types of service —

- for welding, cutting, heating, hardening and inert shielded arc welding.
- on cylinders, manifolds and pipe lines.
- for all types of compressed gases — oxygen, acetylene, nitrogen, hydrogen, helium, argon and other industrial gases.
- for use in the laboratory.
- dual stage regulation . . . single stage regulation — and a quick "reason why" one or the other type would give you desired uniform pressures, at less cost, for a particular job.

Everyone concerned with regulating gases under pressure will find use for this helpful catalog. It will save him time, effort and needless waste of money. It contains data regarding the proper regulator for any given type of job.



AIR REDUCTION
Offices in Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases . . . Calcium Carbide . . . Gas Cutting Machines
Gas Welding and Cutting Apparatus, and Supplies . . . Arc Welders, Electrodes and Accessories

SEPTEMBER, 1949

Want Additional Product Information? See Page 19.

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Send for this valuable,
informative guide today!
Fill in the coupon below.

Air Reduction
60 East 42nd Street
New York 17, N. Y.

Please send me a copy of your
NEW helpful guide to gas regu-
lating problems — Catalog No. 5.

Name _____

Firm _____

Address _____

City _____ State _____

Lick Your Castings Problems with FOREST CITY Quality Castings

Two complete foundries
—equipped for fast pro-
duction — economically!



Valve Plate for Large
Meter, weight 36 lbs.

An 18-pound 2-cylinder
Compressor Body.

Water Pump Housing,
weight 11 lbs.

How the mechanization of equipment has improved and expedited the production of castings, and how Forest City Foundries facilities may affect the efficient production of your products in which gray iron castings are used—are subjects that you can clearly visualize in this new booklet.

Forest City's foundries have been highly mechanized—but that is only half the story. An exceptionally large percentage of our employees have been with us for 20 years or longer—they know how to make Quality Castings, and they take pride in doing it.

With exceptional facilities—two complete foundries with highly experienced manpower—we can supply you with quality castings priced in line with today's market.

Write for the booklet, "Quality Castings—Better Service."

Forest City is geared to the making of a wide range of gray iron castings—S.A.E. or A.S.T.M. Specifications—Plain or Alloyed.

Our representative will gladly call to discuss your castings requirements and our ability to meet them.

The FOREST CITY FOUNDRIES Company

3600 WEST 37TH STREET • CLEVELAND 13, OHIO
TELEPHONE TOWER 1-5040

SALES DEPARTMENT CHANGES AMERICAN STEEL & WIRE CO.

Nine promotions of sales department officials in American Steel & Wire Company have been announced by H. M. Francis, vice president-sales of this U. S. subsidiary, Cleveland, Ohio.



Norman M. Sted, Manager, Manufac-
turers Sales Division.

Included among the new assignments are those of Norman M. Sted to the post of manager of the manufacturers products sales division, at the company's headquarters in Cleveland; Maxwell D. V. Millard as manager of the Detroit district sales office; and Edward A. Murray as manager of the Chicago district sales office.



Edward A. Murray and M. D. V. Mil-
lard, managers Chicago and Detroit
District Sales, respectively.

In their new posts, they succeed to the vacancies created by the appointments on August 1st of R. F. Curtis, Howard B. Maguire, and Clarence T. Gilchrist to newly created positions of area managers of sales at New York, Cleveland, and Chicago.

Robert M. Page to manager of Worcester (Mass.) district sales, succeeding F. Kenneth Sawyer, who retired on August 1st after 44 years of service with the company's sales department in New York, Boston, and Worcester.

Paul Ketting, to the position of director, cold rolled strip sales, at company headquarters in Cleveland.

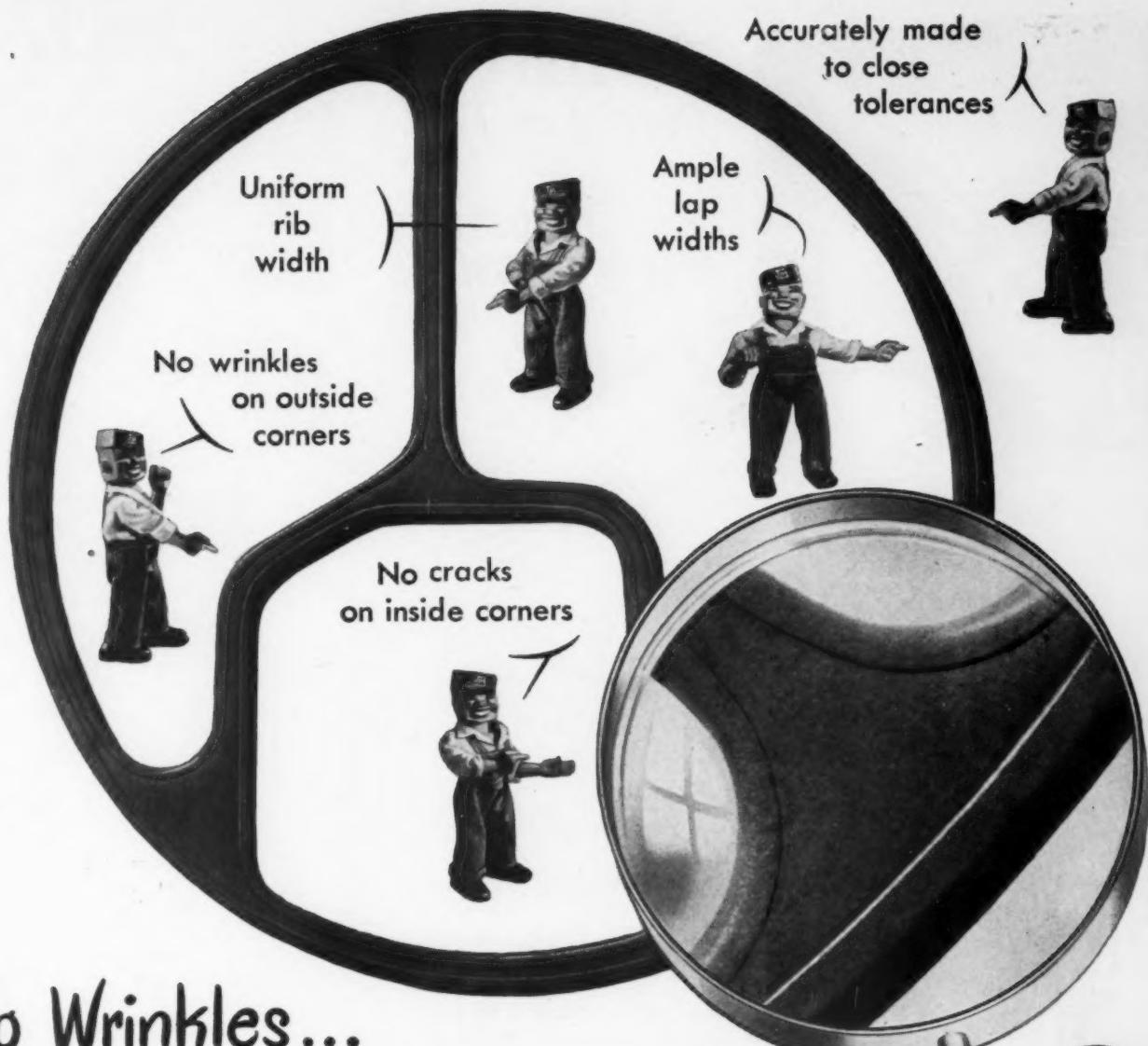
Harry F. McAnerney to assistant manager, manufacturers products sales division, at company headquarters, Cleve-land.

James R. Mohr to assistant manager, Detroit district sales.

Fred L. Nonnenmacher to manager of manufacturers products sales, Chicago.

Frank T. Clarke to manager of manufacturers products sales, New York.

(Please turn to page 212)



No Wrinkles... No Cracks... No Blowouts!

no place for leaks in THIS heat exchanger gasket

TAKE A CLOSE LOOK at the Goetze heat exchanger gasket shown above. Note the absence of wrinkles on outside corners . . . of cracks on inside corners . . . the uniform width of the ribs . . . the generous overlap of the metal jacket.

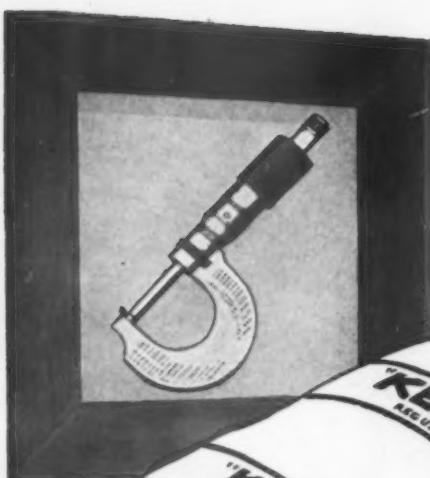
Attention to such important details is typical of the kind of care that goes into the forming of these custom-made gaskets. It is the secret of their dependable service—why you can count on them to stay on the job indefinitely without leaks

or blowouts. And it's the reason they pay off in terms of less down-time and in the savings that result when gaskets *don't* have to be replaced at frequent intervals.

You can have Goetze heat exchanger gaskets made in any size or shape. Estimates and recommendations will be furnished promptly on request. Write Johns-Manville, Box 290, New York 16, N. Y.



Johns-Manville *Goetze* Gaskets



*Like Any Good
Precision Tool*

KEX INDUSTRIAL WIPING TOWELS



are made for a specific job...



and that job is Wiping!

This is why KEX INDUSTRIAL TOWELS are uniformly:

- 1 Soft . . . woven from thirsty cotton with no harsh surfaces to mar delicate machinery or finished products.
- 2 Bound at the edges, so that there are no loose or ragged ends to get caught in moving machinery.
- 3 Made a convenient, uniform size so that every square inch is usable.
- 4 Super-absorbent and scientifically cleansed to reduce possible infection.
- 5 Actually precision items, produced precisely for one purpose only—your important wiping jobs.

Rent KEX wiping towels and figure your profits!

There's nothing to buy, no expensive inventory—just a low monthly rental. KEX TOWELS are delivered in neat, easily stored bundles, regularly in quantities as desired. This helps you control distribution.

For complete information see your classified telephone directory for nearest KEX Distributor, or write KEX NATIONAL SERVICE, 295 Fifth Avenue, New York 16, N. Y.

**"KEX" NATIONAL
SERVICE**
REG. U.S. PAT. OFF.

Want Additional Product Information? See Page 19.

NEW MANAGERS FOR RYERSON STEEL

Joseph T. Ryerson & Son, Inc., steel distributors, have announced the following executive changes.

William G. Findlay, former manager of the company's plant in Pittsburgh, Pa., has been transferred to Chicago, Ill. as manager of the Work Order Division in charge of work order sales for the entire nation-wide group of thirteen Ryerson steel-service plants. Mr. Findlay became associated with Ryerson 27 years ago, serving for 11 years as manager of the Work Order Department at the company's Detroit, Mich. plant. He was appointed head of the Work Order Division at Chicago in 1939, moving to Pittsburgh as plant manager in 1947.



Wm. G. Findlay, Manager of Work Order Division, Chicago

A. L. Petersen, former manager of the company's plant in St. Louis, Mo. has been transferred to Pittsburgh, Pa., succeeding Mr. Findlay as manager. Mr. Petersen joined Ryerson at Chicago in 1913, was transferred to the company's Detroit plant in 1919, and went to St. Louis in 1936 as assistant plant manager, moving up to the post of manager in 1938.

John M. Acee, former manager of sales at the Ryerson plant in St. Louis, Mo., has been named manager of that plant, succeeding Mr. Petersen. Mr. Acee has been with Ryerson since 1920. In 1929 he entered the alloy and stainless steels department of the company at St. Louis and was made head of the department in 1938. He was named manager of sales at St. Louis in 1947.

1 1 1

TELESCOPIC CONVEYORS EXTEND TO 10 FT. 4 INCHES

Extra-light portable telescopic conveyors of the roller type and the skate wheel type, are announced by the Maguire Machinery Co., Inc., 1000 No. Division St., Peekskill, N. Y. The collapsed length of the conveyors is 54"; fully extended they are 10 ft. 4 in. long. They contract or expand on the same plane.

The weight of the conveyor is 80 lbs. It is made of 16 gauge sheet steel, and riding surface is 15" on the roller conveyor, and 12" on the skate wheel type. The conveyors can carry up to 75 lbs. per square foot. Yokes or legs are available.

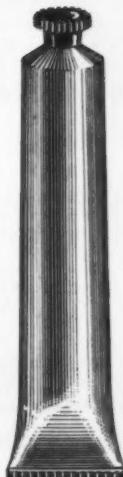
(Please turn to page 214)

Competition Demands . .



. . Speed in the Stretch

Place just one order, and have us: Design and manufacture your collapsible tubes and tube cartons—Fill tubes with your bulk product—Pack and ship the completed tube packages to your markets. One source of supply, one firm to deal with, all operations under one roof. In this way, with Sheffield Tube, you are assured not only all possible speed, but of simplified control of your packaging problems.



It is precisely this combination of facilities that makes for both speed and Sheffield quality that has contributed so greatly in keeping many hundreds of leading tube users with Sheffield for half a century.

To save planning, ordering, handling, and delivery time—to cut freight costs and reduce returned goods losses—to relieve yourself of needless cost-consuming details while adding to your profits—see *Sheffield first*.

*THE SHEFFIELD TUBE CORPORATION

HOME OFFICES • NEW LONDON, CONN.

W. K. SHEFFIELD, V. P. CHICAGO 16, ILLINOIS
NEW YORK 18, N. Y., 500 FIFTH AVENUE 3132 CANAL STREET LOS ANGELES 38, CAL. 7024 MELROSE AVE.
EXPORT: 500 FIFTH AVE., N. Y. CABLE "DENTIFRICE", NEW YORK



*Formerly Named New England Collapsible Tube Co.: Not to be construed as a change in ownership, management, personnel or policies.

How SPEED helped catch "bugs" in the lacquer



Final finish on pianos mysteriously going "sour." Production halted. Lab needed X-ray diffraction camera to identify impurity. At 9 A.M., 10-lb. camera Air Express-ed from 1100 miles away, delivered by 4 P.M. same day. Cost, only \$3.58. Company uses Air Express as routine method to get supplies fast, keep inventory low.



That low \$3.58 figure was total cost for Air Express and included door-to-door service. That makes the *world's fastest* shipping method exceptionally convenient, complete, and easy to use.



Scheduled Airlines carry Air Express on every flight. Speeds up to 5 miles a minute! Direct by air to 1300 cities; air-rail for 22,000 off-airline offices. Serves many foreign countries, too.

FACTS on low Air Express rates

Package of blueprints (4 lbs.) goes 800 miles for \$1.54. Special tools (21 lbs.) go 600 miles for \$3.87. (Every kind of business finds Air Express pays.)

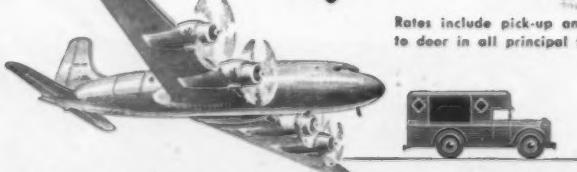
Only Air Express gives you all these advantages: Special pick-up and delivery at no extra cost. You get a receipt for every shipment and delivery is proved by signature of consignee. One-carrier responsibility. Assured protection, too—valuation coverage up to \$50 without extra charge. Practically no limitation on size or weight. For fast shipping action, phone Air Express Division, Railway Express Agency. And specify "Air Express delivery" on orders.

SPECIFY AIR EXPRESS



GETS THERE FIRST

Rates include pick-up and delivery door to door in all principal towns and cities



AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE
SCHEDULED AIRLINES OF THE U.S.

REVERE'S NEW PACIFIC COAST PLANT IN FULL OPERATION

The recently-opened Pacific Coast Division of Revere Copper & Brass Inc., is now in full operation fabricating copper and copper alloy rod and tube for trade in the 11 Western states, according to Division Manager Wallace H. Hitchcock. Located at 6500 East Slauson Avenue in Los Angeles, the new plant has been designed to be a self-sustaining part of the West Coast economy drawing on Pacific Northwest refineries for its virgin copper and purchasing its smelter from the zinc-producing Western states.



Exterior view of Pacific Coast Division Revere Copper & Brass, Inc.

Special facilities have been installed for the handling of copper and brass scrap from local manufacturing plants who in the past have had to ship the bulk of their scrap metal to eastern fabricators.

General offices of the Division are in the office building attached to the plant. Sales offices are also maintained in San Francisco and Seattle.

PART NOT MADE BY ELECTRIC AUTO-LITE CO.

Information that a complaint has been filed by the Federal Trade Commission against one George Luxner, charging false advertising of ignition breaker arms and adjustable contacts, has been received by The Electric Auto-Lite Company, Toledo, Ohio.

The complaint alleges that Luxner, trading as the General Motor Products Co., Suite 1513, 80 Eighth Avenue, New York City, invoiced products to customers as "IGP 3028 A Contacts" and that statements on the manila shipping envelopes represent that the breaker arms and adjustable contacts are original genuine parts manufactured by the Electric Auto-Lite Company, Toledo, Ohio.

Although the number "IGP 3028 A" is a designation used by Electric Auto-Lite to identify this particular part when made by them, the products packaged and sold by Luxner, according to the complaint, are not original or genuine parts made by the Toledo company but are produced by some other manufacturer.

Auto-Lite officials said they hoped the Federal action would result in the removal from the market of parts which, although labelled and marked as Auto-Lite products, were not produced by the company and which have caused confusion and dissatisfaction on the part of Auto-Lite customers and dealers.

(Please turn to page 216)

Fastener appearance that contributes to the sales appeal of the final product—helps you get True Fastener Economy. The exceptionally fine finish of RB&W Cap Screws and Square Head Cup Point Set Screws is the product of more than a century of continuous research and progressive development in fastener manufacturing . . . backed by the skill of four generations of RB&W men and women.



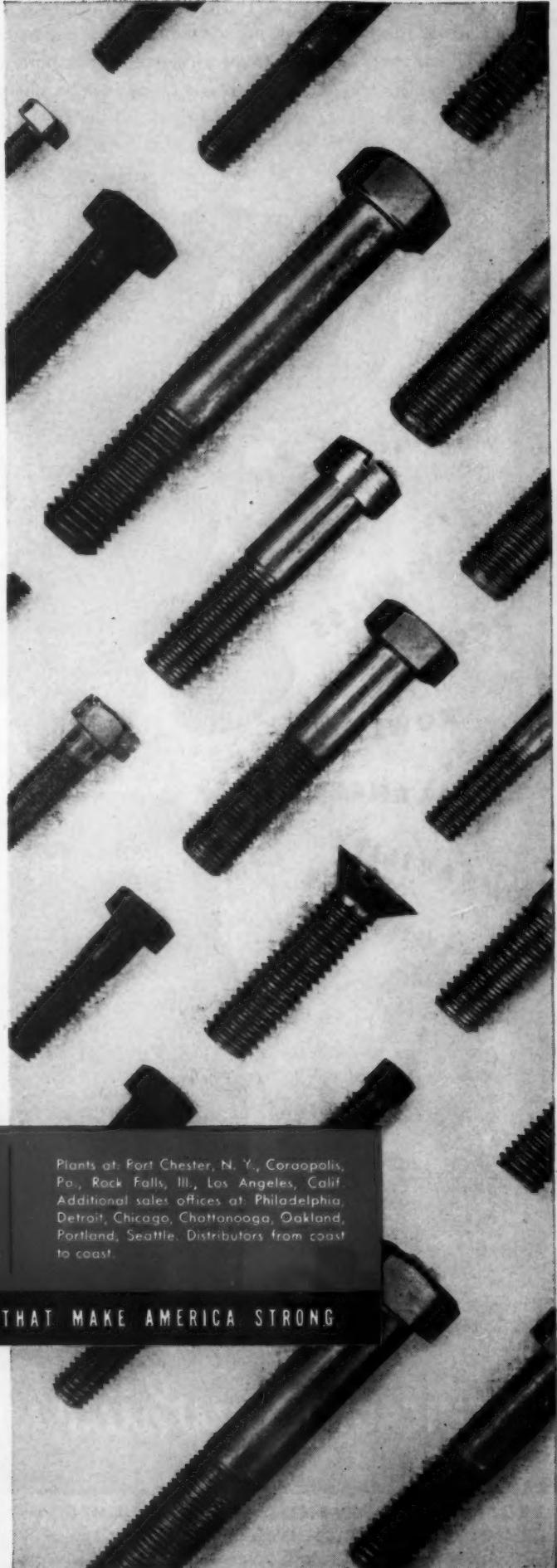
RB&W

THE COMPLETE QUALITY LINE

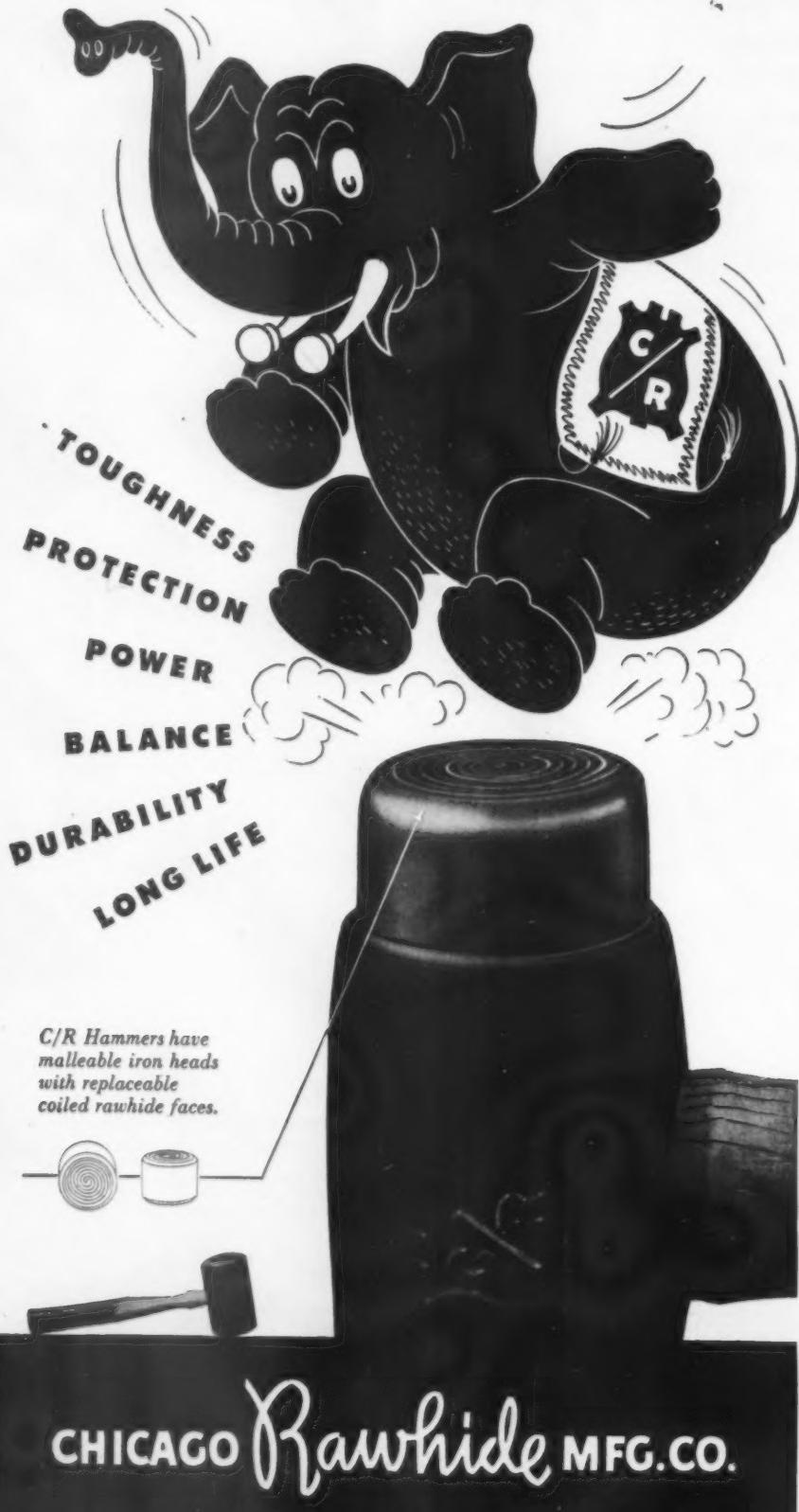
104 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

RUSSELL, BURDSALL & WARD
BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coroopolis,
Pa., Rock Falls, Ill., Los Angeles, Calif.
Additional sales offices at: Philadelphia,
Detroit, Chicago, Chattanooga, Oakland,
Portland, Seattle. Distributors from coast
to coast.



RAWHIDE gives you more in soft hammers and mallets. And Chicago Rawhide gives you exceptional power and maximum protection. C/R hammers and mallets absorb shock, deliver powerful blows, protect finished surfaces and stand up under tough use. For hammers and mallets that never split, crumble or mushroom, always ask for Chicago Rawhide.



1203 ELSTON AVENUE

CHICAGO 22, ILLINOIS

Other C/R maintenance products are: round, flat, twist belting; belt pins and lacings; gears, pinions, gear blanks; aprons, hand leathers; hydraulic packings.

Want Additional Product Information? See Page 19.

BULLETIN DESCRIBES A-C MOTOR OF INFINITELY ADJUSTABLE SPEED

Alternating current motor having infinitely adjustable speed, is described in detail in 12-page bulletin No. 611-D recently released by The Louis Allis Company, 427 E. Stewart St., Milwaukee 7, Wis. Known as the Ajusto-Spede, the new motor provides a variable speed output with a constant torque characteristic through an entirely new eddy current principle without the usual motor generator set or exciter. It operates directly from a 2 or 3 phase a-c line. It is said to be especially suited for driving equipment requiring constant torque input throughout its operating speed range. Continuous duty speed ranges as high as 10 to one are possible in the smaller sizes; intermittent duty speed range is infinite in all sizes.

STEEL MAKING IN AMERICA

The United States Steel Corporation, New York, recently began distribution of a new illustrated book entitled "Steel Making in America." The 100-page volume describes in simple language the manufacture of steel from raw materials through finished steel products of every sort. A brief history of the iron and steel industry from earliest days to the present time is included.

SUPER CORROSION-RESISTANT STAINLESS AVAILABLE IN SHEET AND PLATE FORM

Introduced about a year ago in various wrought forms, a "super corrosion-resistant" stainless steel known as Carpenter Stainless No. 20 is now being commercially produced in the forms of sheet and plate.

Up to the time of its introduction in the wrought forms of bar stock, wire, strip, tubing and pipe, the material was available only in cast form, known as Durimet 20, manufactured by The Duriron Co., Inc., Dayton, Ohio. Wrought forms of the material are produced and sold by The Carpenter Steel Co., Alloy Tube Division, Union, N. J.

Recently-developed manufacturing methods have made possible the commercial production of Stainless No. 20 sheet and plate, previously done on an experimental scale. Stainless No. 20 sheet is produced in standard widths and lengths in gauges from .24 to .11, while plate is being produced in thicknesses from $3/16"$ up. The type analysis of the new alloy is as follows:

Carbon07% max.
Manganese75
Silicon	1.00
Chromium	20.00
Nickel	29.00
Molybdenum	2.00 min.
Copper	3.00 min.

In addition to the superior corrosion resistance provided by the alloy, it retains the good mechanical properties of the 18-8 stainless steels.

(Please turn to page 218)

The article with the lowest price tag can be tempting, can look like a bargain. Yet another brand, with a higher first cost, may be far more economical in the end — because of the longer, better service it gives.

You may find sometimes that Bethlehem wire rope is a bit higher in first cost than some other brand; but on the basis of long-range economy — *true* economy — we invite you to compare it with anybody's product, any place, any time.

Bethlehem has one of the finest, most modern rope mills in the world; a staff of engineers whose sole object is to build longer life and better service into Bethlehem ropes; and a field organization whose job is to study rope trends and rope uses in every industry. All this adds up to one thing — quality; the type of quality that in wire rope means Lower Cost per Unit of Work.

And that's the only real yardstick — the only *real*
measure of economy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

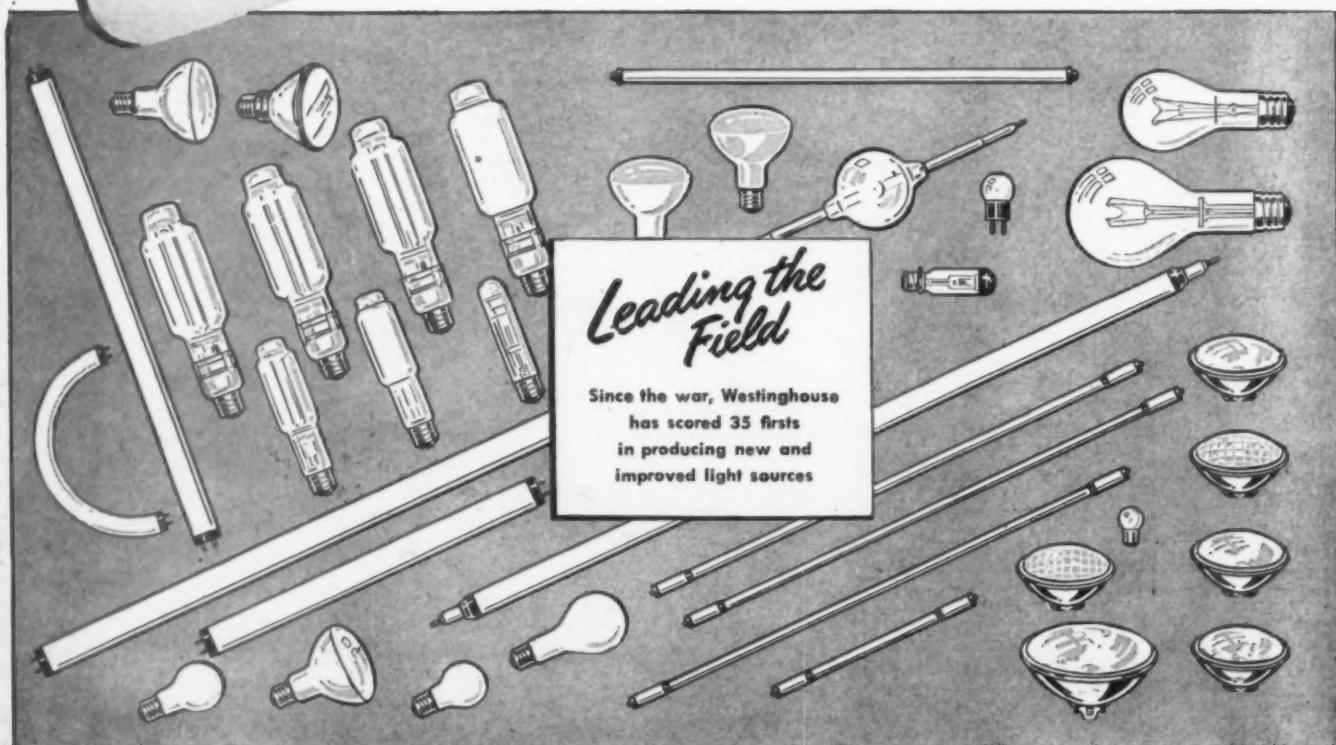
BETHLEHEM STEEL
BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



Westinghouse

Fluorescent Lamps

NOW LAST 3





**SAVE
2/3**

SAVE THIS—one lamp now lasts
as long as 3.

LAMP COSTS

TIME SPENT REPLACING BURNED OUT LAMPS

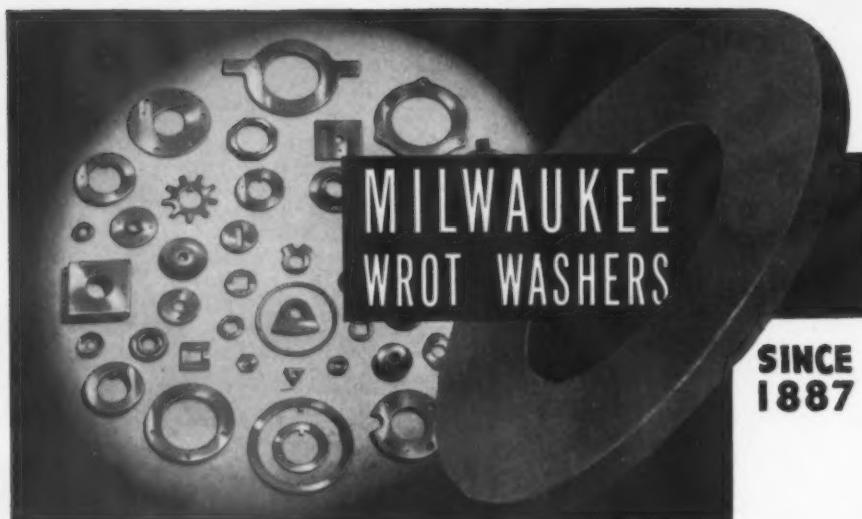
SAVE THIS—lamps need be re-
placed only $\frac{1}{3}$ as often.

Now Westinghouse fluorescent lamps will last $2\frac{1}{2}$ years in average store installations . . . 3 years in average one-shift office or factory installations.

This amazing increase in life was engineered into Westinghouse fluorescent lamps many months ago.

Since then they have been under strenuous life tests—tests that cannot be hurried. Now the results are in and they prove that Westinghouse lamps last three times as long as before! Lamp Division, Westinghouse Electric Corporation, Bloomfield, New Jersey.

**YOU CAN BE SURE...IF IT'S
Westinghouse**



The SYMBOL of QUALITY for 62 YEARS

WASHERS . . . Standard and Special, Every Type, Material, Purpose, Finish . . . STAMPINGS of every Description . . . Blanking, Forming, Drawing, Extruding.

Your most dependable source of supply — the world's largest manufacturer of Washers, serving Industry since 1887. Over 22,000 sets of Dies. Submit your blueprints and quantity requirements for estimates.

**WROUGHT WASHER
MANUFACTURING CO.**
The World's Largest Producer of Washers
2113 S. BAY ST., MILWAUKEE 7, WIS.



IDEAL FOR VARIED PURPOSES

Fig. 732
(Drawer
is extra)
Pat'd. and
Pats. Pending



HALLOWELL WORK BENCHES OF STEEL

These serviceable, ready-made "HALLOWELL" Work Benches of steel are made in standard heights, widths and lengths—with plain steel tops, steel tops covered with Masonite "Tempered Preswood", or laminated wood tops. The "HALLOWELL" is rigid as a rock, does not require costly bolting to the floor. Being standardized, the single "HALLOWELL" Benches around your shop may be bolted together to form one long bench—or vice versa—a money-saving feature not practicable with "nailed-together" wooden benches.

Write for the name and address of your nearest
"HALLOWELL" Industrial Distributor.

SPS

STANDARD PRESSED STEEL CO.

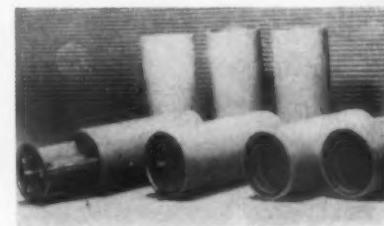
BOX 590, JENKINTOWN, PENNSYLVANIA

"Serving Industry continuously since 1903 through Industrial Distributors"

HIGH-STRENGTH TUBES FOR TEXTILE INDUSTRY

Solution to the problems created by the crushing strength of nylon yarn when packaged in thousands of turns around a shaft or cylinder during the twisting operation, is an inexpensive headless package tube developed for the textile industry by Synthane Corp., Oaks, Pa., manufacturer of laminated plastics.

The tubes are of a material especially developed to provide the abnormal crushing strength which the application demands. As used on tapered-package, double-deck twister made by the U. S. Textile Machine Co., the tubes have an annular groove machined in the inner wall near each end. This groove is engaged by a spring-backed ball which



Phenolic plastic headless package tube

holds the aluminum arbor snugly in the tubes. The tubes are readily adapted to arbors which have catches of other types, and are furnished in diameters to fit arbors of various sizes. Wall thickness in all cases is 3/32-inch. The outer surfaces are round-sanded to provide effective grip for the yarn and the ends are color-coded to help user identify various yarns instantly. The headless type of tube offers no impediment to thorough penetration by steam when the package is steamed to set the twist. Their light weight also reduces shipping cost when packages are shipped from one mill to another.

GENERAL ELECTRIC ANNOUNCES FLUORESCENT STREET LIGHT

The General Electric Company has announced a fluorescent street light which engineers say provides the most comfortable light yet devised for motorists and pedestrians.

"A product of almost two years' engineering development, the new fluorescent street light supplies a softly diffused, virtually glare-less light," according to A. F. Dickerson, manager of the company's Lighting and Rectifier Divisions, Lynn, Mass.

"It was developed for public demonstrational use by electric power companies and municipalities," he said.

"These pioneer installations will enable them to investigate, at first hand, the possibilities of fluorescent street lighting and to compare its performance and characteristics with present-day lighting."

He described the new street light as a cigar-shaped aluminum tube in which two pairs of eight-foot-long fluorescent

(Please turn to page 224)



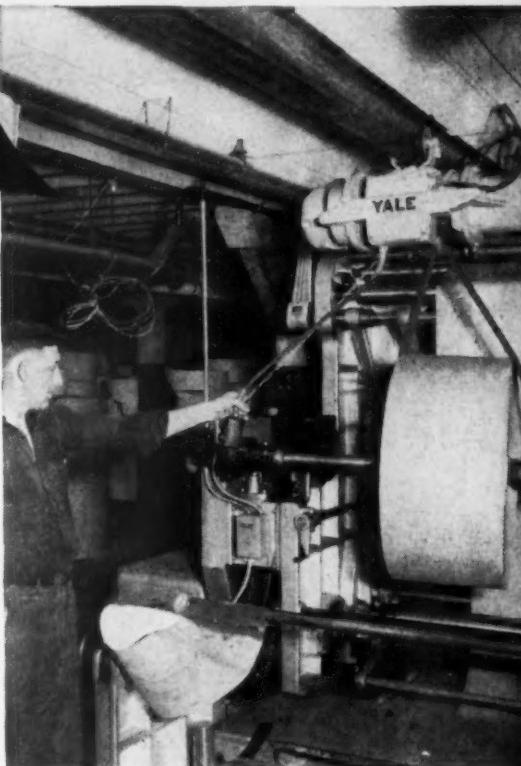
IT'S YOUR MOVE... toward lower costs

Efficient motion is the key to efficient production.

But no longer can industry confine efficient motion to processing operations. Now *material handling* must be included if you hope to cut costs substantially.

Material handling takes a 30% slice out of every production dollar. To reduce that cost thousands of companies are already using Yale Material Handling Machinery. For example, \$300 is saved on each press produced by a manufacturer in Ohio by using Yale Hoists. A grocery warehouse spent \$44 to unload a box car until a fork truck was purchased. Then the cost dropped to \$7. In another case a company gave up counting parts by hand and now uses a Yale Scale to count by weight. Result: greater accuracy and many hours saved each week.

You want lower costs and you want them now. Our nearby representative will gladly give you the benefit of his broad experience in saving time, effort and money for all kinds of businesses. It's your move! Phone him—or write direct to Yale.



THE YALE & TOWNE MANUFACTURING CO.
Department L-69 • Roosevelt Boulevard • Philadelphia 15, PA.



MATERIAL HANDLING MACHINERY • HOISTS • Hand and electric • CRANES • FORKLIFTS

AMERICAN PHILLIPS SCREWS

Play "close harmony" with musical instrument makers in both these vital ways...



1. **"Sweet Music" in Production:** Never a "sour note" of spoilage, delay or accident where these automatically straight-driving American Phillips Screws are used in assembly. Costly materials and hours of skilled workmanship are never wasted or lost. To the contrary, American Phillips Screws combine speed with precision so that *fastening time is cut 50%*, even on the fussiest work.

2. **"Sweet Music" in Promotion:** American Phillips Screws are "grace notes" in their clean, modern appearance on musical instruments and all other products...a signature of quality on the **surface** that certifies the quality within. Wherever you find American Phillips Screws, you find a product that sells well *and stays sold*. Write.

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

Chicago 11: 589 E. Illinois St. Norristown, Pa. Detroit 2: 502 Stephenson Building

4-WINGED DRIVER CAN'T SLIP OUT
OF PHILLIPS TAPERED RECESS

AMERICAN
PHILLIPS *Screws*



T H E G O O D R I G H T H A N D O F I N D U S T R Y

STOCK SIZES WORTHINGTON HEAVY DUTY "QD" SHEAVES WITH MAXIMUM BORES INDICATED

A-SECTION SHEAVES			
PITCH DIA.	GROOVES	1	2
3.0			
3.2			
3.4			
3.6			
3.8			
4.0			
4.2			
4.4			
4.6			
4.8			
5.0			
5.2			
5.4			
5.6			
5.8			
6.0			
6.2			
6.4			
6.6			
6.8			
7.0			
7.4			
8.6			
9.4			
11.0			
12.4			
13.6			
15.4			
16.0			
18.4			
20.0			
24.0			
30.0			
36.0			
44.0			
50.0			
30.0	N.S.	3	3½
38.0		3½	4½

B-SECTION SHEAVES									
PITCH DIA.	GROOVES	1	2	3	4	5	6	7	8
4.0									
4.2									
4.4									
4.6									
4.8									
5.0									
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18.4									
20.0									
24.0									
30.0									
36.0									
44.0									
50.0									
30.0	N.S.	3	3½	4½	X				
38.0		3½	4½	X					

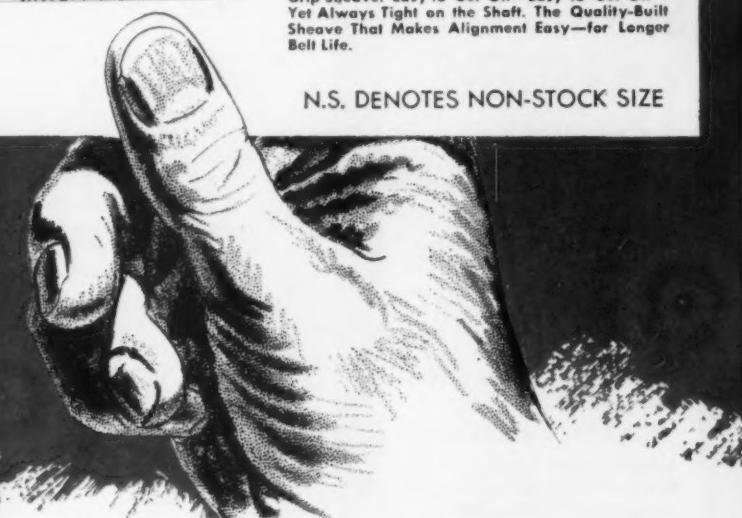
C-SECTION SHEAVES												
PITCH DIA.	GROOVES	1	2	3	4	5	6	7	8	9	10	12
7.0												
7.5												
8.0												
8.5												
9.0												
9.2												
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9.6												
9.8												
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24.0												
30.0												
36.0												
44.0												
50.0												
30.0	N.S.	3	3½	4½	X							
38.0		3½	4½	X								

D-SECTION SHEAVES															
PITCH DIA.	GROOVES	3	4	5	6	7	8	9	10	11	12	14	16	18	20
12.0															
13.0															
13.5															
14.0															
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48.0															
52.0															
56.0															
58.0															
60.0															
64.0															

Worthington QD Sheave—Original Tapered Cone-Grip Sheave. Easy to Get On—Easy to Get Off—Yet Always Tight on the Shaft. The Quality-Built Sheave That Makes Alignment Easy—for Longer Belt Life.

N.S. DENOTES NON-STOCK SIZE

\$2,500,000
INVESTED
IN STOCK



Check your sheave requirements. With more sheaves listed as "stock sizes" and more sizes in stock than any other distributor, your Worthington distributor may be able to save you the cost of a special sheave.

Top-ranking distributors in every industrial center handle Worthington QD Sheaves and Worthington-Goodyear V-belts. They are backed by Worthington warehouses whose stocks duplicate the factory stock at Buffalo—more sizes stocked than any other sheave on the market. With 853 sizes in "A", "B",

"C" and "D" sections, $\frac{1}{2}$ to 600 hp, you can fill almost any rpm requirement with a stock sheave.

Also: 332 listed stock sizes of EC Cord V-belts.

So, when you need sheaves, call your local Worthington Multi-V-Drive distributor—his name is under Worthington in A-Z Section

of THOMAS' REGISTER.

For Balanced Drive Performance

Specify Worthington Multi-V-Drives, with QD Sheaves and Worthington-Goodyear EC Cord V-belts. (Goodyear EC Cord or Steel Cable V-belts are used exclusively in Worthington Multi-V Drives.)

WORTHINGTON PUMP AND MACHINERY CORPORATION

MULTI-V-DRIVE SALES DIVISION

Buffalo, New York—General Offices: Harrison, New Jersey

The Good Right Hand of Industry

POWER TRANSMISSION: sheaves, V-belts, variable speed drives

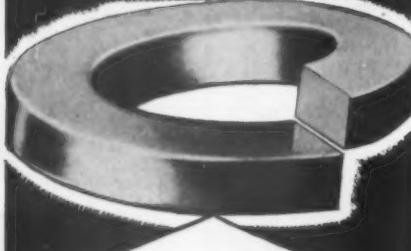
PUMPS: centrifugal, power, rotary, steam

AIR COMPRESSORS: water-cooled, air-cooled



MVM92

CONSTANT POWER ZONE



DIAMOND G SPRING LOCK WASHERS

Assure Longer Lasting Assemblies

The life of the assembly is usually determined by the length of the Power Zone of the fastening device. Diamond G Spring Lock Washers have been designed, developed and torture-tested to provide the maximum Constant Power Zone . . . longer positive holding power.

WASHER FOR EVERY NEED

Whatever your needs in spring lock washers, there's a Diamond G to answer it—high carbon steel, bronze, aluminum, stainless steel and monel metal spring lock washers finished or plated with cadmium, nickel, brass, copper or other finishes . . . plus the new Diamond G Aluminum Spring Lock Washer that combines lightness of aluminum with the strength and durability of steel.

Garrett also manufactures a complete line of flat washers, spring washers, springs, stampings, hose clamps, snap and retainer rings.



Write for your free copy of the technical booklet "Small Parts For Better Production."

DIAMOND G PRODUCTS

Manufactured by
GEORGE K. GARRETT CO., INC.
Philadelphia, Pa.

GARRETT

MANUFACTURERS
OF SMALL PARTS

(Continued from page 220)
lamps are mounted. Two long, highly polished reflectors, mounted back to back, direct the light from these lamps through clear plastic windows to the street pavement.

Emphasizing that many problems must be solved before fluorescent lighting can be considered economical for widespread use, Dickerson said the new street light, nevertheless, represents "a significant advance in the quest for more comfortable seeing."

He listed the major advantages of fluorescent lighting as "softer, more pleasing light," high efficiency lamps with relatively long life, and better visibility for motorists, particularly when pavements are wet.

The major problems still to be solved, he said, are almost entirely economic. "The mounting of these new fluorescent fixtures, which are much larger than conventional designs, and their maintenance, plus a relatively high initial cost, will have a tendency to discourage their immediate use on a widespread scale," he declared. "However, we have no doubt that these problems can be solved after the industry has had an opportunity to analyze the results of pilot installations, some of which will be started this year."

Dickerson pointed out that fluorescent lighting is well-suited for tunnels and underpasses, and for bridges, viaducts, and airport approaches where lights mounted at shoulder level are desirable. For these uses, two especially designed fluorescent fixtures, one for tunnels and the other for shoulder-high mounting along bridges and viaducts, have been developed by G-E engineers.

* * *

NEW TYPE OF GLASS INTRODUCED BY PITTSBURGH PLATE GLASS

A new type of glass for use in metal television picture tubes was recently announced by the Pittsburgh Plate Glass Company. Its use in television tubes is said to cut eye-strain and to increase contrast in images. It acts as a filter to reduce the detrimental effects of room light and to minimize halation, and is now featured on television receivers recently announced by one of the prominent manufacturers.

* * *

DELTASEAL CLOSURE DEVELOPED FOR CELLOPHANE BAGS

Announcement is made by Bemis Bro. Bag Co., St. Louis 2, Mo., that its Deltaseal closure is being used by the Staley Milling Co. of Kansas City on its 2-pound cellophane package for yellow corn meal. Deltaseal is registered trade name for a special type pouring spout closure and for the machinery that forms the closure. Filling and closing bags on Deltaseal machinery is largely automatic and is said to be faster than most other methods. The flat tops and bottoms make it easy to stack the bags for display purposes. The Deltaseal cellophane bag opens easily, the triangular flap at the bottom forming a handy pouring spout.

ARE YOU BUYING ROPE TO BE USED BY INDUSTRIAL PLANTS?



THEY NEED THE BEST!

Maintenance engineers will appreciate the superior strength, endurance and non-kinking qualities of Whitlock Waterflex Manila. This rope, manufactured of high grade fibre, is treated by the well-known Waterflex process—a combination of waterproofing and lubrication at its best.

Ask your supplier for Whitlock Waterflex Cordage.



**WHITLOCK CORDAGE
COMPANY**

46 SOUTH ST., NEW YORK 5, N.Y.

Brown of Philadelphia makes unexpected triple play

1 Abolishes costly rejects

2 Eliminates unit air testing

3 Saves 16% on machining

Base for Throttling and Reset Type Air-Actuated Control Unit

Non-Bleed, Pilot Relay Valve Body. Illustrations are approximately three-quarters actual size.

When Anaconda Die Pressed Brass Forgings replaced sand castings for these two all-important parts of Brown Air Operated Controllers, the play was for a single out — elimination of "leakers" — which, on occasion, ran as high as 60% on underwater air tests and showed up only after complete machining. Naturally, when wrought metal replaced the sand castings, "leakers" were out by a mile — so completely out that costly unit air testing was found to be unnecessary.

That was more than nine years ago, and of the tens of thousands of forgings used in the meantime, nary a one has been thrown out for porosity.

Savings? Plenty — in time and temper — and in cold cash, too. For instance: 16% on combined tooling and machining costs for the base forging alone . . . and that is only one of the many Anaconda Die Pressed Brass Forgings now being used in Brown Instruments.

There are a lot of things about Anaconda Die Pressed Forgings you'll want to know. Publication B-9 goes into detail, telling where, why, how and when. Write for a copy today. Address, The American Brass Company, General Offices: Waterbury 88, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

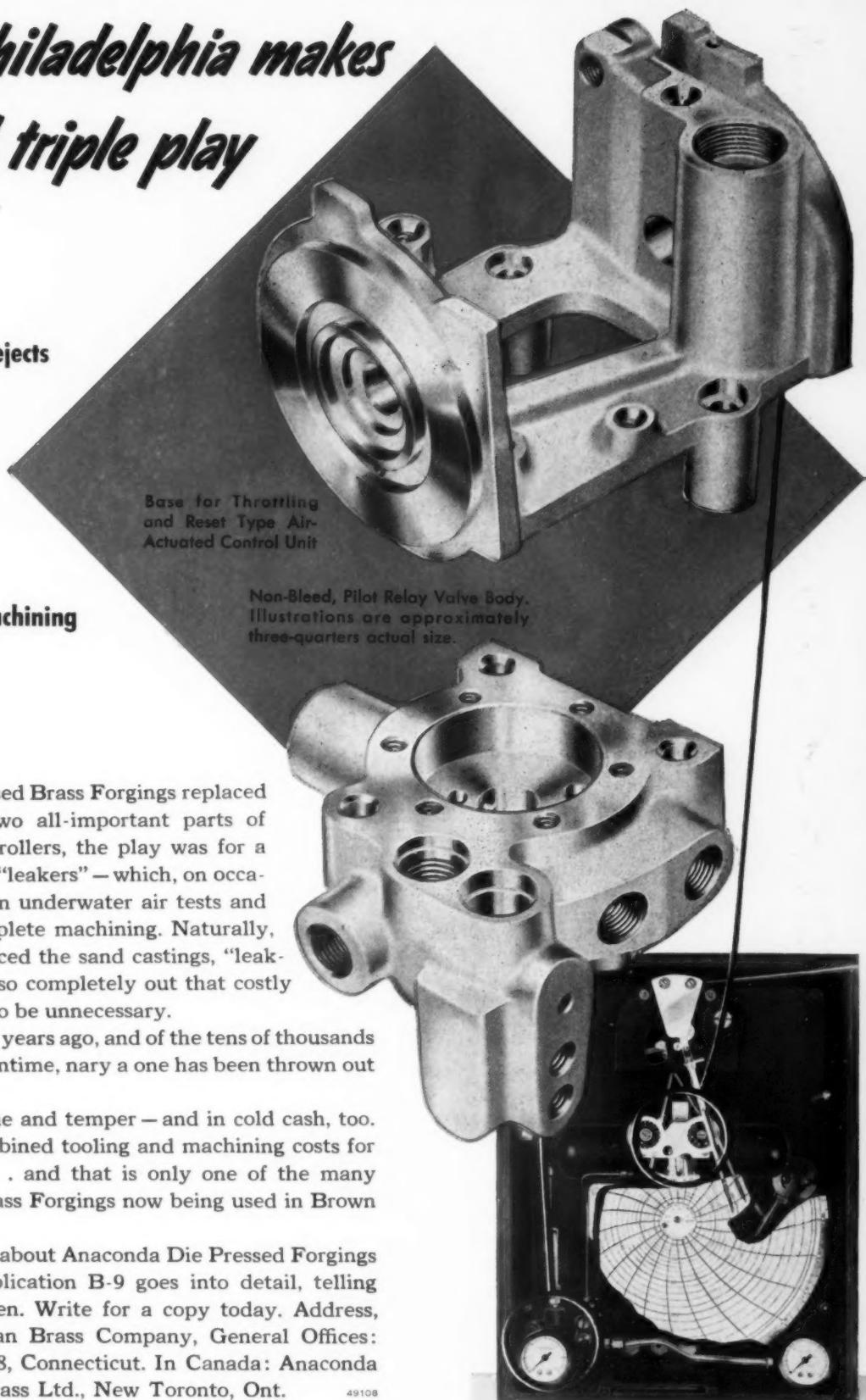
49108



Anaconda DIE PRESSED FORGINGS

BROWN

This is the Brown AIR-O-LINE Recording Flow Controller, manufactured by the Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia. Brown Air Operated Instruments are used the world over for automatically controlling temperature, pressure, flow, liquid level and humidity in industrial processes.





Don't just pick any wire

Let us make it to fit the job exactly

Here in the mills of The American Brass Company, more than 100 different copper alloys are processed into wire in an almost unlimited variety of sizes and shapes, tempers and finishes. The result is that each wire is, in effect, tailor-made . . . especially adapted to particular problems of tooling, rate of production, and desired properties of the finished product. And there's a big difference — both in quality and unit cost — when the wire is exactly suited to the job!

The column at the right very likely holds the combination to that "one best wire". Our Technical Department will help you find it — and it may be easier than you think. Your inquiry entails no obligation whatever.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: Anaconda American Brass Ltd., New Toronto, Ont.



Anaconda
COPPER and COPPER ALLOY
Wire

TYPICAL TYPES OF WIRE

Pin Wire	Hook & Eye Wire	Nail Wire
Screw Wire	Cotter Pin Wire	Rivet Wire
Chain Wire	Brake Lining Wire	Tie Wire
Slide Fastener Wire	Fourdrinier Wire	Welding Wire
Jewelry Wire	Trolley Wire	Brazing Wire

MATERIALS

Copper	Brass	Hitenzo Cadmium
Chromium Copper	Zinc	Bronze
Deoxidized Copper	Phosphor Bronze	*Calsun Bronze
Silver Bearing Copper	Nickel Silver	Ambraloy
Gilding	Cupro Nickel	Special Copper Alloys
Commercial Bronze	*Everdur	*T.M. Reg. U.S. Pat. Off.

SIZES AND SHAPES .002" TO .750"

(Extreme limitations—varying according to alloy and shape)

Round	Half-oval	Square
Half-round	Flat	Hexagonal
Oval	Keystone	Octagonal

Irregular Shapes on Order

FINISHES AND TEMPERS

Cadmium Plated	Bare	Oxidized
Bright Annealed	Tinned	
From Soft Annealed through Spring Tempers; put up on Spools, Reels, Coils or cut to Straight Lengths.		

SUITABLE FOR THESE FABRICATING OPERATIONS

Redrawing	Riveting	Braiding
Cold Heading	Machining	Spinning
Hot Heading	Flat rolling	Weaving
Extruding	Edgewise winding	

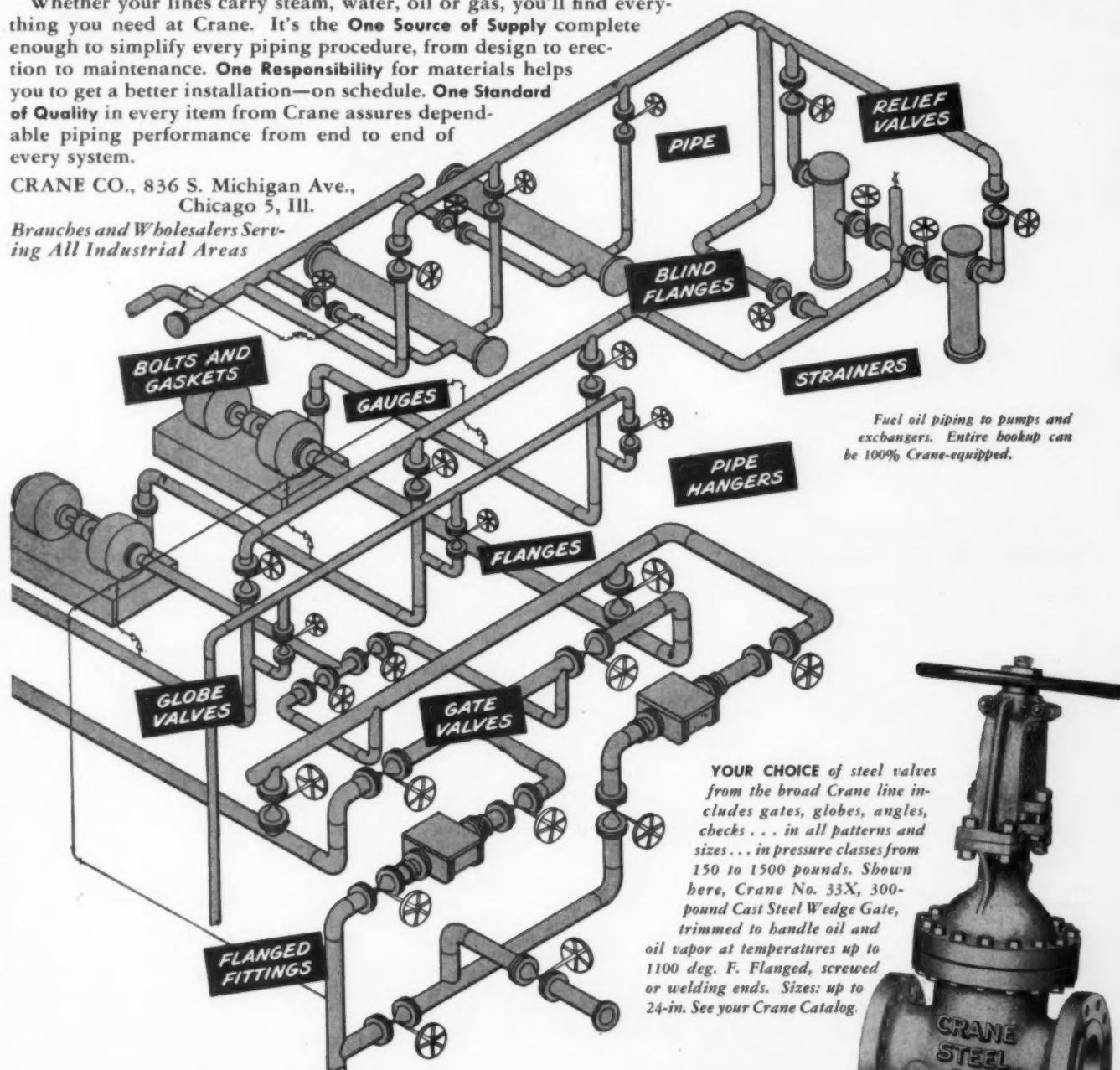
For every piping equipment need ... Look to CRANE for complete selection

Look at This Fuel Oil Piping, for example. Every item in the system can be supplied by Crane. Yet all equipment shown here represents but a small part of the complete selection available to you when you order through your local well-stocked Crane Branch or Wholesaler. One order covers everything for the job—valves, fittings, pipe and accessories . . . of finest quality brass, iron, steel and corrosion-resistant alloys.

Whether your lines carry steam, water, oil or gas, you'll find everything you need at Crane. It's the **One Source of Supply** complete enough to simplify every piping procedure, from design to erection to maintenance. **One Responsibility** for materials helps you to get a better installation—on schedule. **One Standard of Quality** in every item from Crane assures dependable piping performance from end to end of every system.

**CRANE CO., 836 S. Michigan Ave.,
Chicago 5, Ill.**

Branches and Wholesalers Serving All Industrial Areas



YOUR CHOICE of steel valves from the broad Crane line includes gates, globes, angles, checks . . . in all patterns and sizes . . . in pressure classes from 150 to 1500 pounds. Shown here, Crane No. 33X, 300-pound Cast Steel Wedge Gate, trimmed to handle oil and oil vapor at temperatures up to 1100 deg. F. Flanged, screwed or welding ends. Sizes: up to 24-in. See your Crane Catalog.



EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

IS YOUR BOSS

A

"Sherlock Holmes"

?

Management's job is to *use* figures — not *look* for them. And today you're finding they want business records more accurate than ever — and faster. You can look to National for record-keeping forms and equipment that will help supply your management with all the facts they need — on time. Call your Stationer or write direct for our 100-page catalog "Business and Accounting Records." \$1.00 a copy.



For Example

**Modernize with NATIONAL'S
Post Binder Records**

Keep records safe and available in National's Lockmaster* Post Binders. They open easily, lock securely and their wear-resisting covers are styled for the most modern office, yet rugged enough for factory use. And to improve speed and accuracy — Eye-Ease* ledger and columnar sheets, of course.

*Trade Mark Reg. U.S. Pat. Off.



**Depend on National
for Record-Keeping Items that Help You Provide
Accurate Records—FAST**

NATIONAL BLANK BOOK COMPANY, HOLYOKE, MASS. • New York • Chicago • Boston • San Francisco

**PRODUCTION
EXECUTIVE**

Office Equipment and Supplies

University of Illinois Purchase Forms

The accompanying forms were furnished by H. M. Edwards, Director of Purchases, Urbana, Ill. They include invoice-voucher, stores voucher, purchase record and other forms

UNIVERSITY OF ILLINOIS BUSINESS OFFICE URBANA		REQUISITION				ORIGINAL FOR BUSINESS OFFICE																																				
Department Requisitioning		No.	DATE																																							
TO THE PURCHASING AGENT: Please Supply the Following at _____		Room Number	Building																																							
Not Later Than	Call	Ext.	For additional information																																							
QUANTITY	CATALOG NUMBER	ITEM (Give Complete Specifications)	Estimated Cost	Name and Address of Vendor Preferred (If Any)	P. O. Number																																					
<table border="1"> <tr> <td>APPROPRIATION</td> <td colspan="2"></td> <td colspan="3"></td> </tr> <tr> <td>Expense Classification No.</td> <td>2. Office expense</td> <td>3. Travel</td> <td>4. Supplies, including repairs</td> <td>5. Equipment</td> <td>6. Land, Buildings</td> </tr> <tr> <td>Requested by</td> <td colspan="2">In Charge</td> <td>BUSINESS OFFICE</td> <td colspan="2">Received:</td> </tr> <tr> <td>Approved</td> <td colspan="2">Dean or Adm. Officer</td> <td>Chief Accountant</td> <td colspan="2"></td> </tr> <tr> <td>Approved</td> <td colspan="2"></td> <td>Comptroller</td> <td colspan="2"></td> </tr> <tr> <td colspan="6">Purchasing Agent</td> </tr> </table>						APPROPRIATION						Expense Classification No.	2. Office expense	3. Travel	4. Supplies, including repairs	5. Equipment	6. Land, Buildings	Requested by	In Charge		BUSINESS OFFICE	Received:		Approved	Dean or Adm. Officer		Chief Accountant			Approved			Comptroller			Purchasing Agent						20M 210p-20742
APPROPRIATION																																										
Expense Classification No.	2. Office expense	3. Travel	4. Supplies, including repairs	5. Equipment	6. Land, Buildings																																					
Requested by	In Charge		BUSINESS OFFICE	Received:																																						
Approved	Dean or Adm. Officer		Chief Accountant																																							
Approved			Comptroller																																							
Purchasing Agent																																										

Request for Quotation

The Request for Quotation specifically states that "Your quotation must be made on this form". It also provides that prices are F.O.B. a given delivery point, and also includes space for indicating delivery time after receipt of order.

(Please turn to page 230)

Purchase Requisition

This and the accompanying forms, with the exception of the purchase order record and material record card, are printed on standard letter-head size sheets. The requisition provides for indicating Appropriation to which material is to be charged, and Expense Classification. In addition to departmental approval, form calls for approval by chief accountant, comptroller and purchasing agent.

PURCHASING DIVISION 203 Administration Bldg., E. Urbana, Illinois		UNIVERSITY OF ILLINOIS REQUEST FOR QUOTATION				No. <small>IMPORTANT—This form must never be used for correspondence.</small>
This is Not an Order						Date.....
<p>Please submit your prices on this form for the items listed below: The right is reserved to accept or reject all or part of your offer.</p>						INSTRUCTIONS
1. Your quotation must be made on this form and returned by						
2. Give complete specifications for any substitutions offered.						
3. ILLINOIS RETAILER'S OCCUPATIONAL TAX, PACKING, and OTHER COSTS will not be allowed in billing unless they are included in your quotation.						
4. FEDERAL EXCISE TAXES are exempted and exemption certificate will be issued.						
5. Shipments to the University are exempt from Federal Transportation Tax.						
H. M. EDWARDS Director of Purchases						By _____
QUANTITY	UNIT	NUMBER	DESCRIPTION	UNIT LIST PRICE	DISCOUNT	TOTAL NET PRICE
<p>Above prices are F.O.B. F.O.B. DELIVERED Unless Otherwise Stated.</p> <p>Shipment will be made from within days after receipt of order.</p> <p>Date 19 Per ADM-8-49-41294</p>						
<p>IN 100 of each delivery order delivered.</p>						

(Continued from page 229)

KEEP THIS FORM INTACT Do Not Tear It Apart.		UNIVERSITY OF ILLINOIS INVOICE-VOUCHER		UNIVERSITY ORDER NO. MUST BE GIVEN
		DATE _____		
PLEASE RENDER INVOICE IN QUADRUPLETCATE ON THIS FORM AND MAIL ALL COPIES TO:		Pay to:		
UNIVERSITY OF ILLINOIS PURCHASING DIVISION 203 ADMINISTRATION BLDG. (EAST) URBANA, ILLINOIS		NAME OF FIRM STREET AND NUMBER		
TERMS 2% 10th of Month Following, Unless Otherwise Stated.		CITY STATE FIRM INVOICE NO.		
QUANTITY	DESCRIPTION	PRICE	DISC.	AMOUNT
PAYEE SHOULD NOT WRITE BELOW THIS LINE				
APPROPRIATION		EXPENSE CLASS	FUND	VOUCHER NUMBER
REQUISITION NO.	ENC. AMOUNT			
ENCUMBRANCE NO.		CORRECTED AS TO: QUANTITY PRICE EXTENSION	CHIEF ACCOUNTANT	
APPROVED: HEAD OF DEPARTMENT		PURCHASING DIVISION	INVENTORY LIST NUMBER	
APPROVED: DEAN OR ADMINISTRATIVE OFFICER		PER	RECEIVED IN ACCOUNTING DIVISION	LISTED
		INVENTORIED AT	POSTED IN RECEIPT LEDGER	
PRINTED—BLUEREDDLE FORMS, INC., KODAKA FALLS, N.Y.				

Invoice-Voucher

The Invoice-Voucher in quadruplicate is sent to supplier with purchase order, supplier being instructed to return all copies to the purchasing department.

(Please turn to page 332)

Purchase Order

Copy for the Receiving Department is printed on blue stock with the heading "Receiving Report". It bears the instruction—"This form is to be filled out and sent to Purchasing Division the day material is received or service is rendered. If this report indicates a partial shipment, the Purchasing Division will mail to the department a supplemental "Receiving Report" showing materials yet to be received on this order. If for any reason material is unacceptable or service is unsatisfactory, provide full particulars." (also see page 232).

Two Forms Below

Purchase Record and Material Record forms used by Purchasing Department.

UNIVERSITY OF ILLINOIS No. PURCHASE ORDER

DATE _____	
TERMS 2% 10th OF MONTH FOLLOWING, UNLESS OTHERWISE STATED	
PLEASE SUPPLY THE FOLLOWING	
QUANTITY	SHIP VIA
DESCRIPTION	
PRICE	
AMOUNT	
PRICE F. O. B.	
AS PER	
PRINTED—BLUEREDDLE FORMS, INC., KODAKA FALLS, N.Y.	
IMPORTANT ► BILL OF QUADRUPLETCATE INVOICE - VOUCHER ENCLOSED. ADDITIONAL VOUCHER WILL BE FURNISHED ON REQUEST.	
MARK ALL SHIPMENTS: UNIVERSITY OF ILLINOIS (ORDER NO. AS ABOVE) DEPT. _____ URBANA, ILLINOIS	
ADDRESS ALL CORRESPONDENCE TO: UNIVERSITY OF ILLINOIS PURCHASING DIVISION 203 ADMINISTRATION BLDG. - EAST URBANA, ILLINOIS	

H. M. EDWARDS, DIRECTOR OF PURCHASES

BY

ITEM NO.	ARTICLE	SOURCES	UNIT	DEPT.	BUS.	SECTION	ASSESS.	SIZE				
OF SUPPLY												
V												
1												
2												
3												
ORDERED												
DATE	V	ORDER NO.	QUANTITY	LBS.	PER DISCOUNT	NET COST	DATE	ORDER NO.	QUANTITY	MO. 18	LB. 18	CONSUMPTION
										JAN		
										FEB		
										MAR		
										APR		
										MAY		
										JUN		
										JUL		
										AUG		
										SEP		
										OCT		
										NOV		
										DEC		
										MAJ. DANGER MIN.		
PURCHASE RECORD												
URBANA, ILLINOIS												

ISSUED									
DATE	ORDER NO.	QUANTITY REMOVED	QUANTITY REMOVED	BALANCE	DATE	ORDER NO.	QUANTITY REMOVED	QUANTITY REMOVED	BALANCE
PURCHASE RECORD									
URBANA, ILLINOIS									

The Key to Quality Reproduction . . .

UNDERWOOD
CORPORATION



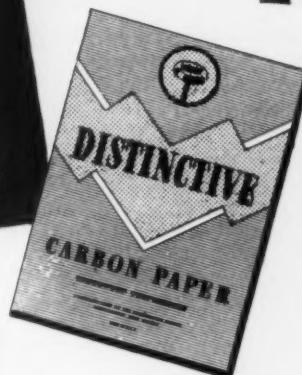
INKED RIBBONS



CARBON ROLLS

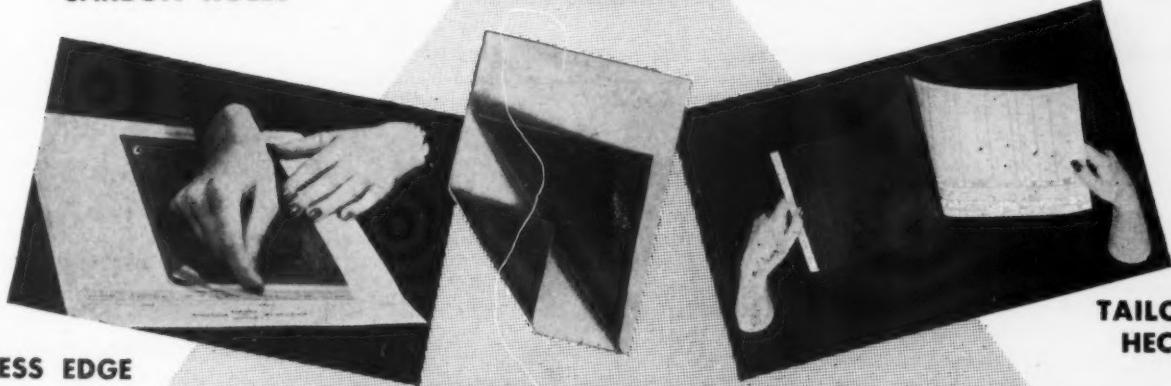
**UNDERWOOD
CORPORATION
SUPPLIES**
for Every Duplicating,
Carbon & Ribbon Need

CARBON
RIBBONS



CARBON
PAPER

TRANSVERSE
CARBON



PRESS EDGE

TAILORED
HECTO

TRY THEM! COMPARE THEM! SEE THE DIFFERENCE!
Samples and prices available at all branch
offices or write direct to us.

UNDERWOOD CORPORATION
Supply Division
BURLINGTON • NEW JERSEY

(Continued from page 230)

JofI				
PRICE F. O. B.			AS PER	
REQ. NO.	APPROPRIATION	ENC. NO.		
MARK ALL SHIPMENTS: UNIVERSITY OF ILLINOIS ORDER NO. AS ABOVE DEPT. _____				
URBANA, ILLINOIS				
INVOICE				
PASSED	AMOUNT	PASSED	AMOUNT	

The reproduction to the right is of record form on the Purchasing Department copy of the purchase order. It provides space for invoice record and for recording transportation charges.

Uof I				
PRICE F. O. B.			AS PER	
REQ. NO.	APPROPRIATION	ENC. NO.		
MARK ALL SHIPMENTS: UNIVERSITY OF ILLINOIS ORDER NO. AS ABOVE DEPT. _____				
URBANA, ILLINOIS				
LOSS OR DAMAGE IN TRANSIT				
1. REPORT LOSS OR DAMAGE IMMEDIATELY TO PURCHASING DIVISION. 2. RETAIN CONTAINER AND CONTENTS FOR INSPECTION. 3. FURNISH DAMAGE REPORT ON FORM SUPPLIED BY PURCHASING DIV.				
Material or Services Received as Indicated Above				
Signed _____ Date _____				
<input type="checkbox"/> PARTIAL <input type="checkbox"/> FREIGHT <input type="checkbox"/> ORDER COMPLETED <input type="checkbox"/> EXPRESS <input type="checkbox"/> CARRIER _____ <input type="checkbox"/> TRUCK <input type="checkbox"/> PRO. NO. _____ <input type="checkbox"/> MAIL <input type="checkbox"/> CHARGES _____ <input type="checkbox"/> LOCAL DELV. <input type="checkbox"/>				

UNIVERSITY OF ILLINOIS BUSINESS OFFICE				
REQUISITION FOR STOCK (For Use of Storerooms Only)				
ORIGINAL FOR PURCHASING OFFICE				
For _____ Storeroom No. _____ Date _____				
Quantity	Description of Commodity Desired	Estimate	Vendor	Order No.
Requested by _____ For Storeroom _____				
Approved by _____ Purchasing Agent _____ 1000-10-47-30437				

Stores Requisition

Requisition for Stock which is used by storerooms only.

ORIGINAL			FOR ACCOUNTING OFFICE	
UNIVERSITY OF ILLINOIS BUSINESS OFFICE URBANA			STOREKEEPER WILL PRICE IN DETAIL, AND FORWARD ORIGINAL AND DUPLICATE TO ACCOUNTING OFFICE	
THE STOREKEEPER OF				
HAS DELIVERED TO ROOM _____ BLDG. _____ 10 _____				
QUANTITY	ARTICLE	STOREKEEPER		
		UNIT COST	TOTAL	
APPROPRIATION			TOTAL CHARGE _____	
DEPT. REG. NO.				
REQUESTED OR RECEIVED BY _____			CREDIT TO _____	
AUDITED	CLASS	FUND		
M 45651				
POSTED STORES DR. POSTED STORES CR. POSTED APPROPRIATION ACCOUNTS				
10M-1-49-40367				

Stores Voucher

Stores Voucher which the storekeeper prices in detail, forwarding original and duplicate copy to the Accounting Office.

CLICK
and it's out!

*removes ALL sizes of
office staples faster, easier!*

new **Swingline**
STAPLE X TRACTOR

Just hold the hook flat over the staple, CLICK—and the staple is OUT! SAVES TIME—it centers itself over the staple, ejects the staple as it extracts it! And it leaves the paper intact — even onionskin!

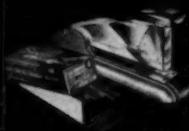
Colorful red, green, blue and grey molded plastic case and chrome-plated steel body. The famed SWINGLINE precision-engineering assures lifetime wear. Retails at 60¢ (slightly higher in the West).

The perfect personalized gift or advertising premium to build sales, goodwill! There's space on the case for company name, trademark or advertising slogan. Get details from your stationer or write direct.



PERFECT PREMIUM! Every office and home that has a stapler needs one. Keeps your company name headlined!

THE SWING IS TO SWINGLINE FOR BETTER STAPLING!
Swingline Staplers in Jeweltone Decorator Colors
Swingline 100% Round Wire Speedpoint Staples



SPEED PRODUCTS COMPANY, INC. • LONG ISLAND CITY 1, N. Y.



The P.A. was in a stew again! . . . trying to make minimum costs even more minimal. Said he, "There must be a way to standardize these umpteen different plant and office forms on umpteen kinds of paper."



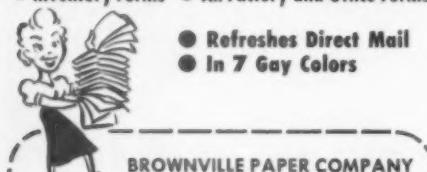
That was my cue. "Time we tried Sea Foam Bond, Boss. Ideal for all kinds of factory and office forms. It's thin and lightweight . . . really costs far less because you get so many extra sheets per pound."



Sea Foam makes 14 carbons with pen, pencil or typewriter. Takes half the file space. Comes in colors for accurate routing. It's nationally advertised . . . and famous for quality for 35 years . . .



- Purchase Orders ● Job Orders ● Report Sheets
- Inventory Forms ● All Factory and Office Forms



BROWNVILLE PAPER COMPANY
15 Bridge St., Brownville, N. Y.

My Boss isn't in a stew but we'd certainly like to cut costs on paper and standardize office forms.

Please send a FREE SEA FOAM TEST KIT and color samples for multiple forms.

Name.....

Company.....

Address.....

We have a printing plant and would like to test Sea Foam Bond with no obligation to us.

Please send me.....
(Indicate requirements for test run)

RALPH WHITE HEADS DIEBOLD MICROFILM DIVISION

Diebold, Incorporated, Canton, Ohio, announces the appointment of Ralph E. White as manager of its Microfilm Division. He will direct the entire operation of the company's Flofilm Division, including the sales organization. He formerly was in charge of procedures and planning of microfilm and record retirement programs for use of all Government agencies, and also served as the National Director of Records and Microphotography for Federal Works Agencies of the National Government. The Diebold Microfilm Division manufactures a complete line of microphotographic and paper reproducing equipment under the trademark Flofilm. This line consists of automatic office equipment for the microfilming, processing, reading and reproduction of records up to and including 42". Mr. White will headquartered at Diebold executive offices, Rockefeller Plaza, New York, N. Y.

VICE PRESIDENT OF VISIBLE INDEX AND VISIRECORD



Warren T. Whitehead, Detroit banker for 25 years, was recently elected vice president and treasurer of the Visible Index Corporation and Visirecord, Inc., of Long Island City, N. Y. He was administrative assistant of the Operations Division of the National Bank of Detroit, with general operating supervision over various departments and functions including purchasing and maintenance. At present, Mr. Whitehead serves as Standards Chairman, Area 6, of the National Office Management Association.

REMINGTON RAND ANNOUNCES NEW FILING CABINETS

New steel filing cabinets in its Aristocrat line, are announced by Remington-Rand, 315 Fourth Avenue, New York. The files are made in a variety of sizes—two to five drawer heights in both letter and legal capacities. The cabinets which are made of heavy gauge steel, spot welded, combined with drawer slide suspension, feature the Gray-Rite finish which is especially blended to complement with any color—oak, mahogany, walnut, green or brown. Printed matter describing the cabinets is available.

(Please turn to page 236)

Take a Tip



USE IT REGULARLY

Every year 25,000 copies of CONOVER-MAST PURCHASING DIRECTORY are delivered to industrial buyers. And they use it regularly because it's a specialized buying directory designed and built for production, purchasing, and engineering executives. It's easy for them to secure sources of supply for all equipment and products used by industry.

Compact, complete, yet easy to handle—that's the CONOVER-MAST PURCHASING DIRECTORY. Use it, and you'll find it's the quickest way to all the information you need.

If your office does not have a copy of the CONOVER-MAST PURCHASING DIRECTORY fill out and return the coupon below.

Conover-Mast PURCHASING DIRECTORY

Formerly Plant Purchasing Directory

Conover-Mast Purchasing Directory
737 N. Michigan Ave.
Chicago 11, Ill.

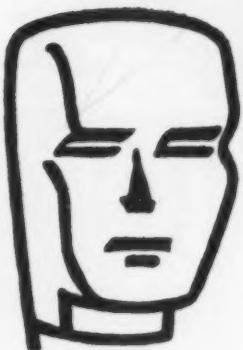
Gentlemen: Provided our Company receives a copy of the Conover-Mast Purchasing Directory, we will definitely use it in our industrial buying. That, we understand, is our only obligation.

Name _____ Title _____

Company _____

Street _____

City _____ Zone _____ State _____



ROBOT-KARDEX

...REMINGTON RAND'S NEWEST CONTRIBUTION
TO THE FIELD OF SCIENTIFIC RECORD KEEPING

Requires only 13.4 square feet
of floor space, holds over 4000
complete sets of visible records.



THE FIRST ELECTRIFIED VISIBLE RECORD SYSTEM

Now, for the first time, an *electrically-operated*, visible record system . . . ROBOT-KARDEX . . . gives you all the advantages of famous Kardex Graph-A-Matic control plus greater posting efficiency than ever before!

Here's a mechanized file and a desk in one space-saving automatic unit. Just press the index key . . . your Kardex records in their convenient slides are positioned, *electrically*, at desk-height working level.

Productivity and morale go up. Fatigue and drudgery go out! And, you obtain up to 30% savings in employee hours spent in record posting.

To learn more about machine-sure, speedy ROBOT-KARDEX . . . and how it puts your record-keeping dollars to work . . . write for booklet KD 505 to Systems Division, 315 Fourth Ave., New York 10. Copyright 1949 by Remington Rand Inc.



SEND NOW FOR THE NEW
ROBOT-KARDEX BOOKLET

Remington Rand THE FIRST NAME IN BUSINESS SYSTEMS

MONGOL
STAYS
SHARPER
LONGER!*



Not only do you save sharpening time by writing with a Mongol...you get a hi-strength, Woodclinched lead, too...guaranteed not to break in normal use. The eraser is of finest quality, firmly gripped in a metal ferrule.

*Scientific laboratory tests conclusively prove point-sharpness superiority for the exclusive MONGOL Complastic lead — over the average of all well known pencils in the MONGOL price range.

TRADE MARKS REG. U. S. PAT. OFF.

EBERHARD FABER

ENTERING OUR SECOND
CENTURY OF LEADERSHIP



ROTARY CARD FILE WITH ELECTRIC CONTROL

Announcement is made by the Her-ring - Hall - Marvin Safe Company, Hamilton, Ohio, of the Rotary Record File with automatic control. Any one of more than 5000 card records are brought to full view without effort or change of position on the part of the operator by a "magic wheel" that securely holds, without fastening, rods, clips or holders, over 5000 cards in any position of the wheel. Individual cards or groups of cards can be instantly removed for post-



The automatic rotary card file

ing or round-the-office reference. One automatic control switch brings every card in the file into full view. Patented floating dividers simplify the selection, removal and insertion of cards. Electrical connection wire can be removed from file as well as wall outlet. Light touch on the roll-control switch moves the wheel in either direction. The file is available for 3 x 5", 4 x 6", 5 x 8", and tabulating cards. Completely portable desk models are available; these are hand operated and self-braking.

The metal cover in the file is counterbalanced and concealed within the cabinet when open. Plunger-type lock safeguards confidential records. The file is mounted on hard-rubber casters.

NEW WHITEPRINTING AND DEVELOPING MACHINE

New medium production white printing and developing machine (dry direct process), the 60-G has been marketed by C. F. Pease Co., Chicago, Ill. It replaces the Pease 55-G, and is designed for the same kind of whiteprint production. A special feature is the light source, a 60 watt per inch high pressure mercury tube which permits printing speeds up to a maximum of 18 ft. per minute. The printer and developer are synchronized to the same mechanical speeds. A constant wattage transformer is of special significance where power line variations may occur. It provides efficient tube performance even though power line variations may range from 200 to 250 volts.

(Please turn to page 238)

THIN PAPERS

Reduce
 TYPING, MAILING
 and FILING COSTS

Use
ESLEECK
 THIN PAPERS

Fidelity Onion Skin
 Clearcopy Onion Skin
 Superior Manifold

Esleek Manufacturing Co.
 Turners Falls, Mass.



in **Oxford**
PENDAFLEX®
 hanging folders



Eliminate by-guess or by-gosh filing that wastes your firm's time and money! Pendaflex folders hang firm and straight:

never sag, slump or slip out of sight! Any Pendaflex folder can be found in an instant! Today! Empty your cabinet drawer, set in a Pendaflex frame, and hang Pendaflex folders from the frame. You'll see the results in 100% filing efficiency!

TODAY! Drop us a card for catalog and name of nearby dealer!
Oxford FILING SUPPLY CO., INC.
 Garden City, New York



bring your layouts to life:
print on *Ticonderoga Text*
and **COVERWEIGHT**

Feature attraction on your printing program is Ticonderoga Text and Coverweight! Right for every process—letterpress, offset or gravure. The perfect combination for menus, programs, booklets and brochures.

Watermarked, plain and deckle-edged Ticonderoga Text comes in 7 colors plus cream and brite white, laid or wove, with envelopes to match.

For double success, team it up with Ticonderoga Coverweight.

International Paper Company, 220 East 42nd Street, New York 17, N.Y.



INTERNATIONAL PAPERS
for Printing and Converting



WHICH SAVES MONEY IN Your CASE?



THE MORRIS
DIP TYPE DESK SET



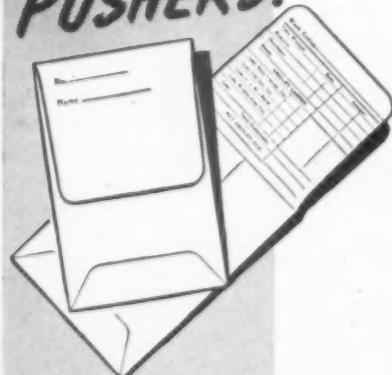
THE MORRIS
FOUNTAIN PEN DESK SET

Are you using the correct writing equipment in your organization? The answer may mean a lot of money—wasted or saved. There is a proper use for dip type sets or fountain pen type sets. Let us advise you, engineer your writing needs. Send a letter or wire. No obligation.

Famous Morris Pen Desk Sets
are used and sold everywhere.

THE *Bert M. Morris* COMPANY
8651 WEST THIRD ST. • LOS ANGELES 37, CALIF.

PRODUCTION PUSHERS!



Yes, it's the "do re mi" in the old payroll envelope that pays off in production—and it's a valuable means of employee communication. From payroll envelopes to job tickets, Sheppard products can save you money in your paper work. Call the home of Mint-E-Seal, the envelopes with the Flavor-Seal Flap . . .

Sheppard
ENVELOPE CO.
No. 1 Envelope Terrace
Worcester 4, Mass.
Phone: 2-4674

ROLLING PROCESS FOR APPLICATION OF GOLD PLATE

Karat gold can now be rolled to a mirror finish and as thin as electroplate on any non-ferrous metal base by what is termed the Inter-Weld process developed by the Gold Filled division of the American Silver Co., Inc., Flushing, N. Y. The new method is said to be a tremendous time saver compared to the conventional method of manufacturing from brass and then polishing and electroplating to achieve the desired gold color. The rolled gold layer is said to be far tougher and longer wearing than a comparable thickness of gold electroplate.

In the new process, the gold layer is welded to a barrier layer of pure nickel and this dual thickness is soldered to the base metal in the conventional manner. By welding the gold layer instead of soldering it and by the introduction of the barrier layer of nickel, "bleeding" is said to be overcome completely. Ratios as low as 1/600 have been achieved with a karat gold thickness of 9/1,000,000th of an inch and less with a brilliant mirror finish.

While the Inter-Weld process was developed primarily for the manufacture of rolled gold plate and gold filled, the company states it is adaptable to the manufacture of silver items such as hollowware, jewelry and articles now using silver electroplate.

The method obviates the use of polishing and electroplating operations after fabrication. The color of the gold can be accurately controlled, and will be uniform regardless of the thickness of the gold, it is stated. One or both sides of a sheet may be plated to the same or different specifications of texture, color and thickness. The plate is furnished in rolls, the coils interleaved with tissue or if preferred protected by a plastic strip coating which may be left on during the stamping and drawing operations. The gold filled and rolled gold plate can be supplied with a base of brass, nickel silver, nickel, monel, cupro-nickel or beryllium copper.

1 1 1

NEW LINE OF AIRFOAM OFFICE CHAIR CUSHIONS

A new, exclusive line of Air-foam-cushioned office chair cushions has been announced by American Latex Products Corporation, 921 Venice Blvd., Los Angeles 15, Calif.

The new cushions will be available in a full range of styles and sizes. Three covers will be featured: a durable, leather-like plastic, a distinctive fibre pattern and a removable frizette. The plastic is furnished in brown, gray, green or maroon; and the frizette in green or brown. The fibre comes in one style only.

Both the executive size (16" x 18") and the secretarial (14" x 15") are available in either one or two-inch thicknesses. An "oversize" (17" x 19") size comes in two-inch thickness only. The new line also includes 14" round drafting stool or bar cushions.

15 legible copies at a time,

when I use

BRITTAINS COPYKING

That paper sure saves a
lot of typing, Mr. P. A.!



Brittains CopyKing combines thin air mail paper lightness, strong softness and high opacity. It is the ideal time-saver for all typing that requires up to 15 or 18 clear copies. Use Brittains CopyKing for air mail, accounting tissues, reports, price lists, and dozens of other ways. Standard sizes: 8½" x 11" and 8½" x 13"; other sizes obtainable. Color: white. Write for samples and ream prices.

B. F. DRAKENFELD & CO., INC.
45-47 Park Place • New York 7, N. Y.

Brittains CopyKing

THE KING OF MULTIPLE COPY PAPERS

get the Xmas gift problem off your neck!

It's simple! It's easy!
You'll be Glad! They'll be happy!

Here's your answer. Dozens...hundreds...or thousands all attractively wrapped ready to present or packaged for mailing. STYLES AND VALUES TO FIT YOUR CASE. You'll be amazed at what a dollar will buy. Fount-O-Ink writing principle is the most efficient ever devised. Fount-O-Ink writing sets are constant reminders of your good wishes for years. Fount-O-Ink eliminates dry or empty pens.

INSTANT-TOUCH-WRITING
HYDROSTATIC-AUTOMATIC
BEAUTIFUL-USEFUL-DIFFERENT

Send for Catalog and gift service information!

GREGORY Fount-O-Ink Company
3501 Eagle Rock Blvd., Los Angeles 65, California

PRE-COAT FOR BLUEPRINT PAPER GIVES BETTER PRINTS

Approximately 40 per cent of the blueprinters in the United States and Canada have been licensed for application of Mertone, a new pre-coating for blueprint paper, Monsanto Chemical Company announced recently.

Produced and developed by Monsanto's Merrimac Division, Boston, Mass., Mertone produces prints with uniform deep blue backgrounds without burning out faint lines of tracings, the company reports. Other claims by Monsanto for the blueprint pre-coating product include greater latitude in printing speeds, fewer changes in machine speed and less waste through over-exposure.

1 1 1

ROYAL TYPEWRITER CO. OPENS WHITE PLAINS, N. Y. BRANCH



The Royal Typewriter Co. recently opened a new branch at 25 Mamaroneck Avenue, White Plains, N. Y. James F. Vreeland, formerly sales manager of the company's Roytype Supplies Division has been named District Manager at White Plains, with sales supervision in Bronx, Westchester, Putnam, Orange and Rockland counties. A full line of office typewriters, portable typewriters and Roytype business machine supplies will be maintained at the White Plains office.

1 1 1

BIRMINGHAM AND RICHMOND MANAGERS ANNOUNCED BY ROYAL

S. T. Aliffi, formerly typewriter salesman at Chicago, has been promoted to the position of District Manager at Birmingham, Ala., and D. A. Coursey, formerly district Manager at Birmingham, has been appointed District Manager at Richmond, Va.

1 1 1

BUSINESS GIFTS ANNOUNCED BY AUTOPOINT

As a part of its diversification program, the Autopoint Company, Chicago, announces a line of leathergoods for distribution as business gifts only, which includes billfolds, pocket secretaries and key holders. They are made of calf, cowhide and pigskin leather and nylon-stitched for long wear. The billfolds have two disappearing spare key pockets.

(Please turn to page 240)

What if
your secretary
had
your job?



You can bet "your P.A. job" she'd know what carbon paper to buy because she's an expert.

She realizes that the right choice of carbon paper is vitally important to her efficiency. Chances are she prefers Webster's Micrometric Carbon Paper — the only carbon paper with the numbered scale. It warns her when she approaches the bottom of a page . . . assures neater spacing of letters . . . results in faster work. Micrometric's "clipped corner" permits easy removal and keeps hands clean.

Yes, Mr. P.A., your secretary would buy Micrometric because it costs no more than any other quality carbon paper. Besides, it helps her do a better job for you.

Factory warehouses from coast to coast mean quick delivery of Micrometric and other Webster products to over 2000 dealers — and to you. So order "Webster's" the next time you want carbon paper or typewriter ribbons; duplicating carbon papers and accessories; ribbons and carbons for Elliott-Fisher, Addressing, Adding and International Business Machines. Consult your nearest dealer, or write to F. S. Webster Company, 7 Amherst Street, Cambridge 42, Mass. Warehouses in New York, Philadelphia, Pittsburgh, Detroit, Chicago, San Francisco.

Better buy ...

WEBSTER'S
MultiKopy
Micrometric Carbon Papers
and Typewriter Ribbons

TRIPLE-PURPOSE CAMERA MAKES COPIES OF 42" BLUEPRINTS

New Triple Purpose Camera recently introduced by the Diebold Company, Canton, Ohio, is capable of accepting 42" blueprints or other material to be copied, copying 400 pieces per hour. The camera makes positive prints, and maker states that full sized blow-up reproductions show no noticeable loss of quality.



The new camera will accept 42" blueprints or other material

Another feature is the office-sized processor for the film. Films can be developed in one hour. The film can be transported from camera to processor in daylight; no dark room is necessary. The camera and the processor are on wheels for portability and easy handling in the office.

Despite the speed of the finished work, the work is said to surpass government regulations on chemical purity required for lasting quality of the film.

EIGHT NEW MACHINES ANNOUNCED BY IBM

The addition of eight new machines to its line of products was recently announced by International Business Machines Corp., New York, N. Y. The new products include an accounting machine with wheel printing which lists 150 lines of information a minute from IBM cards or accumulates information from IBM cards at the rate of 150 cards a minute; an entirely new card punch of increased efficiency and ease of operation which is available in both a non-printing model, and a printing model for simultaneous interpretation of the information punched in the cards, and for punching numerical data only or for both numerical and alphabetical information; a card-programmed electronic calculator embodying developments from the construction of large IBM calculators for pure and applied science; a new electronic collator which handles cards punched with codes and other designations of materials; a device which permits the use of IBM cards in the automatic operation of the IBM electric typewriter; an electronic statistical machine which combines for the first time the various functions of preparing statistical information; an improved proof machine for sorting and listing bank checks, sales slips and similar documents, and a time recorder of increased flexibility and improved functioning.

SMALL SAFE FOR OFFICES

New steel safe for office use, measuring 30 $\frac{1}{2}$ " high, 14 $\frac{1}{2}$ " wide and 25 $\frac{5}{8}$ " deep, is being introduced by the Cole Steel Equipment Co., Inc., 285 Madison Ave.,

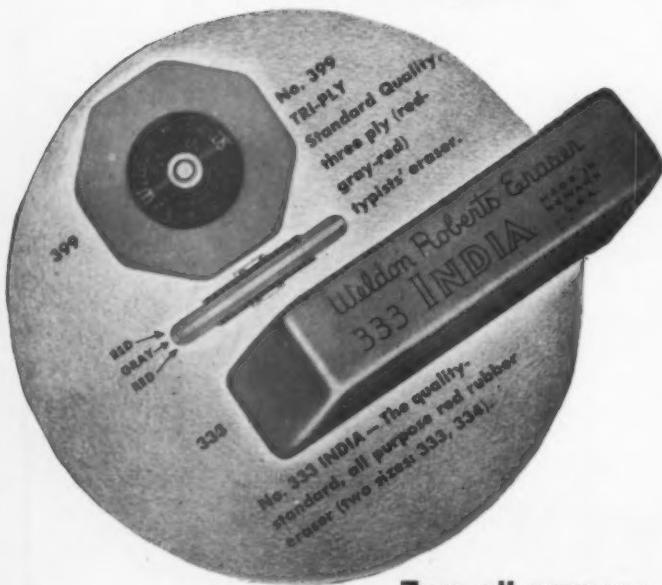


The two safety vaults have extra lock and key

New York 17, N. Y. It is featured by two safety vault boxes with extra lock and key, and is built of heavy gauge furniture steel. The safe is equipped with a Yale three-wheel screw wedge combination lock with three interlocking bolts and "tamperproof" hinges.

Weldon Roberts Erasers

They Correct Mistakes
in Any Language



Two all purpose quality erasers.

WORLD'S QUALITY STANDARD

WELDON ROBERTS RUBBER COMPANY
Newark 7, New Jersey

ANNOUNCING

An Expanded, Helpful Service to Purchasing Agents and Buyers and Other Department Heads.

The Reader Service Department

of Purchasing Magazine

will procure for you any bulletin, catalog, or printed matter that may be mentioned in any of the advertising pages, as well as the catalogs and bulletins listed in the "Ask Purch" pages, or on products mentioned in the New Products Section.

You merely list your wants by Page Number and name of Product (or company) on the Postage-paid Reader Service Post Cards on Pages 19 and 20.

Thus you can keep your Catalog and Information files up-to-date, with minimum effort on your part. Our Reader Service Department will give your Postal request immediate attention.

Check Your Wants on the Cards as you Go through the Pages — That's All.

NEW INTER-OFFICE PHONE SYSTEM EASES SWITCHBOARD LOAD

Inter-office communication instruments which permit two-way natural conversations without use of the usual push-to-talk key, thereby leaving the hands free for other duties, have been developed by the Modern Telephone Corp. of 509 Madison Ave., N. Y. 22. The instruments require no tubes.

Designed primarily for executives and their staff members, the name of the caller lights up on the executive's instrument, leaving him free to refuse the call, if he is busy, and pick it up later.

No one can cut in on the executive but he can link himself with his staff when desired without eavesdropping, even when they are conversing with each other. This is done by means of a light signal on each staff station, which indicates to the staff member who is called, that his conversation should be terminated quickly as the boss is trying to call



him. The equipment is interconnected so that any staff member can converse with any other and as many conversations can go on at once as there are pairs of instruments.

The entirely automatic and fully inter-communicating feature of the system takes the load of inter-office calls completely off the phones and switchboards which are used for outside calls.

EQUIPMENT DESIGNED TO SPEED MAIL HANDLING

Two entirely new products, designed to speed incoming and outgoing mail in any size business office, have been announced by Commercial Controls Corp., Rochester 2, N. Y. They are the multiOpener and the multiSealer, both all-electric, high speed machines.

The multiOpener will automatically open and stack thousands of envelopes per hour. It has an automatic cutting adjustment. The dial may be set for a light, medium or heavy cut. Uniform cutting the full length of envelope edge without injury to contents is assured by the precision feed principle of the machine.

The multiSealer has a water feed which assures uniform flow of water to the gummed envelope flap. Any excess water is automatically returned to the tank. This unit is equipped with an all-new sealing blade for positive sealing and constant cleanliness. It seals all standard size envelopes.

Both machines have large adjustable receiving hopper to accommodate various sized envelopes. They are finished in soft grey wrinkle with satin stainless steel trim.



**BETTER LOOKING
DOCUMENTS?**

Rising is Right! Here's Why—

Rising Parchment is unexcelled for high opacity. This all-important quality makes a finer impression, makes for easier reading. For mortgages and other documents your printer will advise the best "buy" is undoubtedly—

Rising Parchment

✓ 100% rag ✓ super opaque

✓ 6 standard sizes of envelopes

✓ distinctive unglazed parchment finish

✓ four weights

WHEN YOU WANT TO KNOW... GO TO AN EXPERT!

Rising Papers

ASK YOUR PRINTER... HE KNOWS PAPER!

Rising Paper Company, Housatonic, Mass.

DIAL THE POINT



NEW!

First and only sharpener with an outside point selector—the patented Apsco SELECTOR model. See your dealer for a demonstration or write today for his name.



Pencil Sharpeners

AUTOMATIC PENCIL SHARPENER CO.
1817 EIGHTEENTH AVENUE, ROCKFORD, ILLINOIS
OFFICES IN NORTH HOLLYWOOD AND TORONTO

Among the ASSOCIATIONS

Educational Buyers Hold Successful First Purchasing Course at Columbia University

The first annual Purchasing Institute conducted by the National Association of Educational Buyers was held at Teachers College, Columbia University, New York, N. Y., on August 22 to 26. The short course in purchasing for higher educational institutions proved highly successful, and was attended by representatives of more than 40 institutions in all parts of the country.

F. L. Abbott, Purchasing Agent and Superintendent of Operations of Teachers College, presided at the first session, which was opened with greetings from Daniel R. Davies, Executive Officer of Teachers College, on behalf of the university, and Bert Ahrens, Executive Secretary of the N.A.E.B. Subjects covered under the general heading of Purchasing Administration during the morning, and the institute faculty members leading the group, were: "Educating the Purchasing Staff to the Program and Needs of the Institution", Thad L. Hungate, Controller, Teachers College; "Educating the Staff of the Institution to the Value of the Purchasing Department", Robert B. Jenkins, Assistant Dean, School of Commerce, Accounts, and Finance, New York University; "Office Organization and Job Assignments for Purchasing", Leslie F. Robbins, Purchasing Agent, University of Colorado.

John A. Pond, Assistant Purchasing Agent, University of Chicago, conducted the single afternoon class on Purchasing Operations, discussing "Some Suggested Approaches in Considering the Purchase of Scientific Equipment, Apparatus and Supplies". Discussion groups were held in the evening.

Administration problems were considered during the Tuesday morning session, at which Leslie F. Robbins spoke on "Essential Purchasing Forms, Records and Reports". Charles W. Hayes, Director of Purchases, Emory University, followed with "Preparation of a Departmental Manual, Including a Flow Chart of Purchasing Procedures".

Stuart F. Heinritz, Editor of PURCHASING, was the speaker at the luncheon meeting, on "Measuring the Effectiveness of the Purchasing Department".

The afternoon session on Purchasing Operations was taken over by George F. Frank, Purchasing Agent, Cornell University, whose subject was "Some Suggested Approaches to the Problems of Purchasing Paper and Printing". Group meetings were again held in the evening.

On Wednesday morning, August 24, Leslie F. Robbins led the portion of the session on Purchasing Administration with a discussion on "Influence of Various Factors such as Quality, Quantity, Price and Service in a Purchasing Decision". Charles W. Hayes discussed "Problems in the Purchase of Office Equipment, Machines and Supplies" in the time devoted to Purchasing Operations.

The Wednesday afternoon session featured talks on "How to Purchase Dormitory Furniture and Fixtures" by Harold W. Loman, Purchasing Agent, Penn State College, and "How to Purchase New Construction" by Carl M. F. Peterson, Superintendent of Buildings and Power, Massachusetts Institute of Technology. There was no evening session.

Purchasing Administration subjects covered in the Thursday morning session included "The Public Relations Aspect of Purchasing" by Leslie F. Robbins, and "Organization and Operation of a Receiving and Stores Department" by Charles W. Hayes.

Henry H. Linn, Professor of Education, Teachers College, opened the Thursday afternoon session on Purchasing Operations with a discussion of "How to Purchase Housekeeping Equipment and Supplies". Leslie C. Helm, Superintendent of Engineering, Teachers College, spoke on "What Do You Get When You Purchase Fuel?". Group meetings were held in the evening.

The final morning session, on Friday, August 26, featured a discussion on "How to Specify Your Purchase: By Performance, Brand, or Detailed Specification", led by Leslie F. Robbins.

F. J. Schlink, Editor, Consumers' Research, was the principal speaker at the luncheon session on the subject, "Practical Methods for Testing New, Sample and Purchased Materials".

The Institute closed on Friday afternoon, following reports of a group chairmen, report of the evaluation committee, a summary of the highlights of the course by Mr. Abbott, and the presentation of certificates by Rev. J. Leo Sullivan, Director of Purchases, Holy Cross College, and Vice President of N.A.E.B.

BALTIMORE ASSOCIATION SCHEDULES NINTH ANNUAL MANUFACTURERS' PRODUCTS EXHIBIT

The Purchasing Agents Association of Baltimore, is again sponsoring its Annual Manufacturers' Products Exhibit, which is scheduled to be held at the Lord Baltimore Hotel, Baltimore, Md., October 11, 12 and 13th. This will be the association's ninth annual industrial show, and will feature the latest developments in electronic, factory, building, mill, office supplies and equipment, some of which will be in operation. Prizes will be awarded for the most informative, the most attractive, and most decorative booths, respectively.

Stephen J. Buschman, Stark Electric Company, is general chairman, and John Schwartz of the Maryland Trust Company, and W. A. Johnson of the Balmar Corp., are vice chairmen. Detailed information about the exhibit may be had by writing to General Chairman Buschman at 604 Nicholl Ave., Baltimore, Md.

N.A.P.A. District Conference

District 1—San Francisco, Calif., September 16-17

District 2—Houston, Tex., October 12-13

District 5—Hamilton Ont., October 14-15

District 6—Pittsburgh, Pa., October 28-29

District 7—Jacksonville, Fla., October 10-11

District 9—Boston, Mass., October 19-20

GOULD "Z" PLATE—

*66% More Resistant
To Peroxidation!*

—ONLY GOULD HAS IT!



The Gould "Thirty"
More than ever—America's
Finest Industrial Truck Battery

Tests prove that the new progressive solidification and casting techniques employed in the "Z" Plate make the grid 66% more resistant to peroxidation! And why not? Here is the only positive grid in existence that is non-porous and completely solid all the way through—that produces full power throughout long battery life.

This is only one of the reasons why Gould "Z" Plate Batteries stay new longer . . . operate at full capacity more months! Another is a remarkable regenerative active material that renews its energy every day the battery is in use!

This revolutionary "Z" Plate didn't just happen. Its perfection required years of research in Gould's modern laboratories and almost endless testing in Gould's own pilot plant.

Gould "Z" Plate Batteries are so superior to anything heretofore available, you can't afford anything else. Decide NOW on Gould "Z" Plate Batteries. Write us outlining your requirements and we will be glad to submit a proposal by return mail.

GOULD
STORAGE BATTERY
CORPORATION
TRENTON 7, NEW JERSEY

Always Use Gould Automobile and Truck Batteries

SOCIAL PROGRAMS MARK SUMMER ACTIVITIES OF ASSOCIATIONS

Association activity in the summer months generally followed a pattern of social events this year, as it has done in the past. Several of the parties and outings reported are listed here.

The annual picnic of the Purchasing Agents Association of Washington (state) was held on July 23. The association's annual golf tournament took place on August 19 at the Rainier Golf Club.

The Purchasing Agents Association of Buffalo held its annual picnic in Clarence, N. Y. on August 10.

The annual clambake and outing of the Purchasing Agents Association of Syracuse and Central New York was held on July 28.

The Chattanooga Purchasing Agents Association held its annual boat ride on Tuesday night, July 12. Sixty members, with their wives and children made the trip up the Tennessee River and on beautiful Lake Chickamauga. Jack Kinnell was master of ceremonies. Chicken baskets were served to all members and guests, and all expenses were paid by the Chattanooga Association.

The annual picnic of the Purchasing Agents Association of Alabama was held at the Cascade Plunge, Birmingham, on August 24. The affair featured swimming, refreshments, a picnic dinner, a water show, and a super bingo game with prizes.

Members and guests of the Purchasing Agents Association of Louisville attended an outing at the New Albany Country Club on July 12. Golf, swimming, and various games of chance were featured. After a dinner of Southern fried chicken a large number of draw prizes were awarded.

NEW YORK ASSOCIATION COMMITTEE CHAIRMEN NAMED

Chairmen of standing committees of the Purchasing Agents Association of New York have been announced by President G. W. Howard Ahl as follows:

Advisory, H. W. Macintosh; attendance, E. M. Krech; auditing, H. M. Van Cleaf; dinner, E. G. Jaehne; educational, A. M. Kennedy, Jr.; eligibility, M. D. MacBurney; forum, Wm. P. E. Ainsworth; membership, Frank Stan Romane; nominating, D. M. Meeker; outside activities, W. M. Hoffmann; program, R. Park Lamborn; reception, Elsie B. Gruber.

HAWAII ASSN. HEARS REPORTS ON MAINLAND PURCHASING

Restarick Withington, Purchasing Agent for the Honolulu Gas Company, was the guest speaker at a recent meeting of the Purchasing Agents Association of Hawaii, held in the Kewalo Inn. Mr. Withington, who had just returned from a trip to the mainland, visited the purchasing departments of a number of large

firms during his trip. He assured the group that the methods they were following were up-to-date, in the light of what he had seen.

Herbert Cullen, chairman of the educational committee, presented a movie entitled "The Paint Film", in which the various aspects of paint manufacture were shown. A discussion on the methods of determining value in paint buying was held following the showing of the film.

LOUISVILLE ASSN. TO HONOR NEW N.A.P.A. PRESIDENT

The first business meeting of the new association year of the Purchasing Agents Association of Louisville, to be held on September 20, will be designated "T. A. Corcoran Night" in honor of the recently elected president of the National Association of Purchasing Agents. Mr. Corcoran, Purchasing Agent for the Courier Journal and Louisville Times, is an active member of the local association, but it is felt that in his activities as national president he will be unable to attend more than a few meetings of the local group, and the association wishes to "start him off with best wishes". All members of the 7th District are invited to attend the meeting.

ROCHESTER ASSOCIATION CONTINUES PROGRESSIVE EDUCATIONAL MEETING PROGRAM

On Sept. 28, 1949 the Purchasing Agents Association of Rochester will inaugurate its 1949-50 season.

The program for the year, as outlined by Perc Coomber, chairman, emphasizes the educational phase of purchasing. All the very successful features of last year are being continued. The business index charts on steel production, commodity prices, P. V. line, Rochester Index of Business Activity and Cost of Living, will again be given an important spot on each program.

The September meeting will be devoted to a discussion on Safety and its relation to the P. A.

The October 26th meeting will be the annual Executives' Nite. Top management will be out in force to hear the featured speaker, Representative James Wadsworth. This meeting will continue the trend of education thru information, Representative Wadsworth's topic being The Relationship of Government to Business.

Every effort has been made to engage one of the leading men in each field to be covered. In future meetings a wide variety of subjects pertinent to today's purchasing problems will be discussed, such as plastics, aluminum, lumber and steel.

Milwaukee Assn. Officers Discuss Plans



Milwaukee Journal Photo

Shown above are the newly elected officers of the Milwaukee Association of Purchasing Agents discussing plans for association activities during the coming year. Among the activities will be an educational program featuring discussions of purchasing's part in management, how-to-buy sessions, and studies of means of improving departmental functions. The association will again sponsor

a credit course at Marquette University. Officers are, left to right: W. Howel Pritchard, Kearney & Trecker, president; C. H. Dawley, Ampco Metal, Inc., national director; F. S. Perkins, Globe Steel Tubes Co., secretary; K. E. Groth, Stolper Steel Products Corp., treasurer; and N. A. Schowalter, West Bend Aluminum Co., West Bend, vice-president.

(Please turn to page 246)

You know you're right with "G-E White"



These are five of the reasons why General Electric white rigid conduit is such a general favorite with electrical contractors and maintenance men everywhere.

Always, when you think of conduit for protection from atmospheric corrosion, think of "G-E White." For further information, see your nearest General Electric Construction Materials distributor, or write to Section C21-970, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

*Trade-mark Reg. U. S. Pat. Off.

GENERAL ELECTRIC

RACEWAYS ROUNDUP with your **GENERAL ELECTRIC** Construction Materials Distributor



Where chemical corrosion is a threat to wiring, specify General Electric black rigid conduit. "G-E Black" is made from the same high grade steel as "G-E White." "G-E Black" is treated with a protective coating of tough, black enamel, baked on at high temperature. This hard, glassy-smooth finish makes wire pulling easy, and is an excellent paint base.

Service entrance cable fittings in a wide variety are available from General Electric. This line includes a large selection of the popular types of waterproof entrance caps, sill plates, cable straps and watertight connectors.



If you're wondering how to get raceway protection for wiring in cramped quarters, for machine tool or temporary wiring, General Electric flexible steel conduit is the answer. This conduit is strong, yet very flexible. It's quickly installed, and the zinc-coated strip steel is wound in a way that makes wire pulling easy.

Your General Electric distributor can save you lots of time and trouble when you order wiring materials. Because he carries the complete General Electric line, you can order every item you need from him. One order does it — no running around getting part of your order in one place and part in another. It's the kind of "one-stop, one-package" service busy contractors need to help stretch scarce working hours.



**Conduit
Products**

Cost reduction on protective work gloves with 25% longer-wearing NEOX



NEOX
Coated:
Many styles,
three weights.



Natural Rubber
Coated: Rough
surface, sure grip.

Palm-coated, fabric-back styles are also available.

Edmont
FABRIC-LINED
NEOX-COATED
GLOVES

Resilient neoprene combined with durable plastic, chemically welded to high tensile fabric lining. Gives snag-proof, liquid-proof, safer protection against acids, caustics, oils, greases, solvents, at provably* lower cost.

*Free test offer: Send brief description of your operation, materials handled and temperature conditions. We will forward samples of the type glove we recommend, for on-the-job test and report. Edmont Mfg. Co., 540 Orange St., Coshocton, Ohio.

TULSA ASSOCIATION MAKES ANNUAL BARTLESVILLE TRIP

The annual "Bartlesville Day" program of the Purchasing Agents Association of Tulsa was held at Bartlesville, Okla. on August 2.

The large group from the association visited the Reda Pump Company in the morning and inspected new, improved methods of drilling and pumping wells. Luncheon was served there. In the afternoon, members toured the Woolaroc lodge of Frank Phillips. A reception was held at Hillcrest Country club in the late afternoon, and dinner was served at 7 p.m.

1 1 1

NICHOLSON FILE OFFERS EDUCATIONAL SERVICE

Nicholson File Company, Providence 1, Rhode Island, is making available the services of Walter R. Buerckel for talks on how to select and use the right file for a job. The lecture, illustrated by slides, has been successful in increasing efficiency in filing in many of the largest industrial plants.



WALTER R. BUERCKEL

The talk is simple enough for trainees to understand, and technical enough to interest and help experienced foremen and machinists.

Winter schedules for the talk are being made up now, and engagements can be made by writing directly to the company.

1 1 1

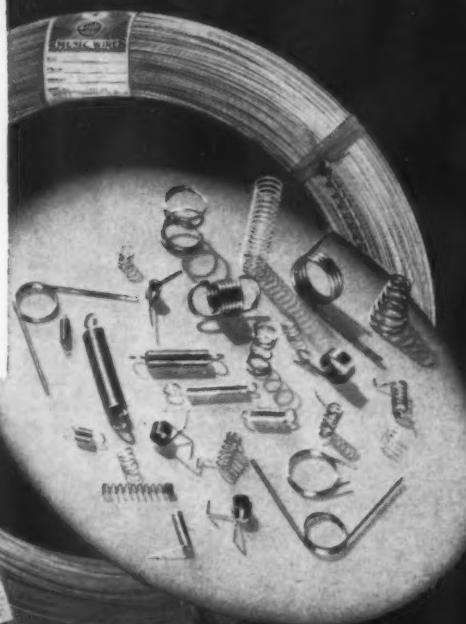
KALAMAZOO ASSOCIATION HOLDS TWO MEETINGS

The Purchasing Agents Association of Kalamazoo met at the Columbia Hotel on August 11 for a regular luncheon meeting. A film entitled "Story of Tenite" was shown by Leo Spitsky of Modern Plastics Corp., Benton Harbor, Mich. James Donahue was chairman of meeting.

At the previous meeting, Dr. Alfred H. Nadelman, head of the Pulp & Paper School of Western Michigan College, was the principal speaker. His subject was "A New Venture at Western Michigan College". J. W. Hartung was chairman of the meeting.

(Please turn to page 248)

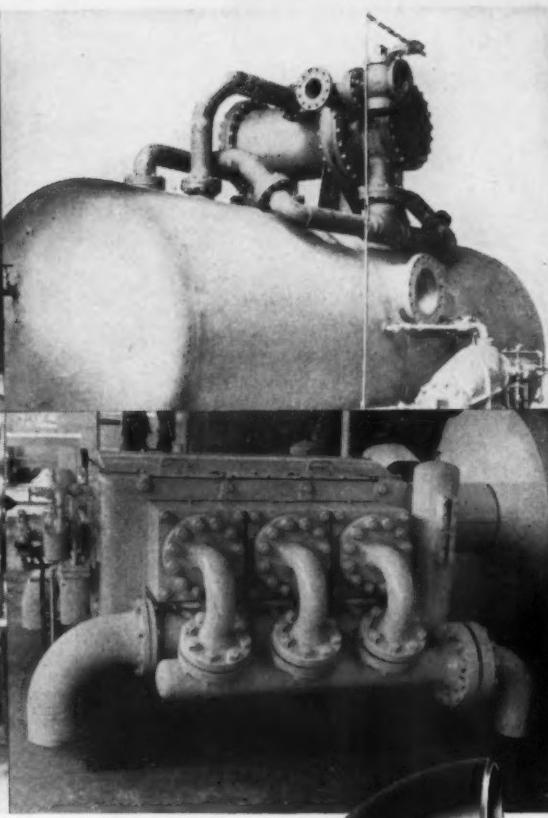
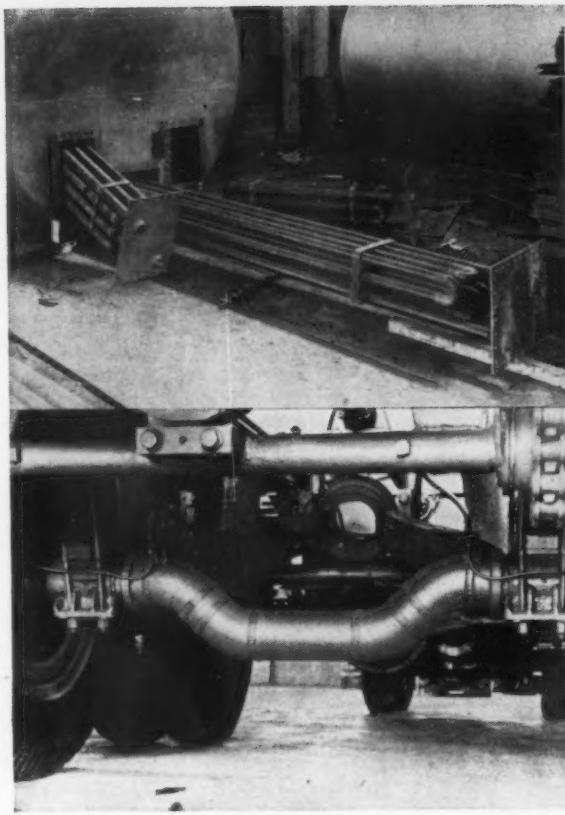
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Uniform cast
Uniform tensile
Uniform size
Self lubricating
surface
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Want Additional Product Information? See Page 19.



If the job involves piping
SIMPLIFY, IMPROVE, ECONOMIZE



with Tube-Turn welding fittings

THE industrial equipment illustrated above differs. Yet, in one respect it's exactly alike. The piping is fabricated with standard-size, factory-made TUBE-TURN welding fittings. This makes for utmost simplicity—simplicity in getting the fittings, simplicity of piping design.

No shoulders outside. No "pockets" inside. Without wasting an inch of space or an ounce of weight, TUBE-TURN welding fittings permit entirely functional piping, and ideal flow conditions at points of direction change. Their dimen-

sional accuracy permits cutting to odd angles.

They save money, two ways. First, they reduce fabricating time and work. Second, they eliminate the need for piping maintenance. The solid, welded joints are permanently leakproof.

Many intricate piping problems in a wide range of industries have been solved advantageously through the use of TUBE-TURN welding fittings.

For a thorough study of your problem and practical recommendations, consult your TUBE-TURN distributor.



District Offices at New York, Philadelphia, Pittsburgh, Chicago, Houston, Tulsa, San Francisco, Los Angeles

Tube Turns, Inc., 246 E. Broadway, Dept. J, Louisville 1, Kentucky

Please send folder, "Dimensional Data and Weights of Tube-Turn Welding Fittings".

Name _____ Position _____

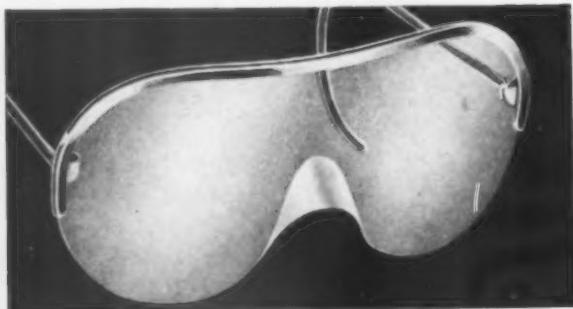
Firm Name _____

Address _____

WILLSON . . .

has the remedy!

In order to get the goggles out of a worker's pocket, add the comfort factor to protection in eye safety equipment. You'll go a long way towards curing workers of such neglect.



FeatherSpec Style FW2

Here is comfort in nine-tenths of an ounce. WILLSON FeatherSpecs* with a large, overall plastic lens rest lightly on the nose and can be worn all day—even over prescription spectacles—with-out fatigue. Workers say they hardly know they are wearing any eye protection. Yet they prove adequate protection on many jobs such as light grinding, woodworking, spot welding and inspection of work in process.

If you want your investment in safety equipment to pay off—don't neglect comfort in your specifications.



WILLSON*

*Established 1870

WILLSON PRODUCTS, INC. • 221 WASHINGTON ST. • READING, PA.



Want Additional Product Information? See Page 19.

PURCHASING

NEW EMPLOYEE TRAINING PUBLICATION ISSUED

A new employee training publication, entitled "Steve Merritt", is being issued by Teamwork Publications, 1790 Broadway, New York 19, N. Y. The 32-page booklet has its purpose the promotion of management-labor cooperation, helping employees to better understand and appreciate the American economic system, and providing specific training material on such subjects as safety, quality of workmanship, use of tools and similar topics.

The publication uses the comic strip technique to get management's story across to employees. Each message is woven into an interesting story. The booklet is published monthly and mailed to the home of the employee.



NEW BOOKLET DESCRIBES THE WILLYS-OVERLAND FORGE

The huge Willys-Overland Forge, Toledo, Ohio, with capacity for hammering and pressing out 80,000,000 pounds of forgings a year, its services and facilities are described in detail by text and graphic illustrations, in new 24-page booklet, copy of which is available on request. The Forge is one of the largest and most complete in the country, with approximately five acres of work space, which "practices forging as a craft."



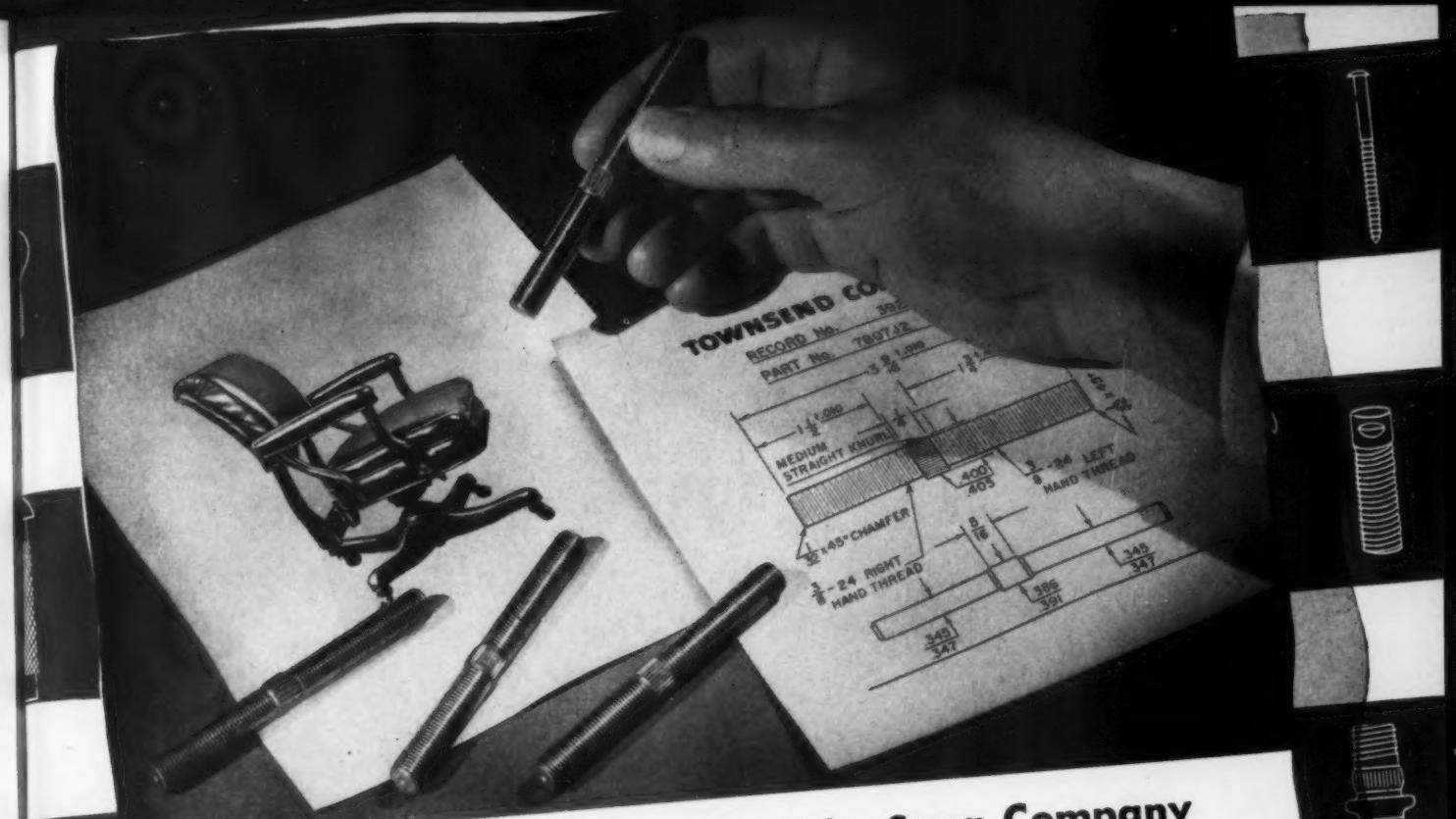
TABLES OF SINES AND COSINES TO FIFTEEN DECIMAL PLACES

For many years the extreme difficulty of obtaining high-accuracy tables of sines and cosines with decimal subdivisions of a degree has seriously inconvenienced workers in such fields as observational astronomy, geodesy, navigation, optical instrument design, ballistics, rocket research, radar, and aircraft design. To meet this need, the National Bureau of Standards has just issued a 95-page booklet of tables of sines and cosines to 15 decimal places at hundredths of a degree. The booklet is now available from the U. S. Government Printing Office.

In the new tables the columns of sines and cosines are arranged side by side for convenience in cases where both the sine and cosine functions are desired for the same argument or where Taylor's theorem is to be used for interpolation. Alongside the tabular entries are presented the second central differences, which are sufficient for interpolation to the full 15 decimal places.

NBS Publication AMS 5, *Tables of Sines and Cosines to Fifteen Decimal Places at Hundredths of a Degree*, 95 pages, 10 1/4 by 7 3/4 inches, 40 cents a copy, is obtainable from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Remittances for foreign countries must be made in United States exchange and must include an additional sum of one-third the publication price to cover mailing costs.

(Please turn to page 252)



**Here's How Townsend Saved The Seng Company
\$27.63 Per Thousand On One Cold Headed Part**

This is an example of how a Chicago manufacturer, who might have been you, saved a large amount of money through the use of a Townsend cold headed part and thereby produced a better product for less money. The threaded adjusting screw (illustrated above) for the tilt back chairs is now being produced at Townsend by cold heading, knurling and roll threading for only \$16.87 per thousand. The lowest price quoted for screw machine production was \$44.50. This clear saving of \$27.63 per thousand is important because Seng chair action control production is extremely high. Not only that, the Townsend part, being cold formed, is stronger than a part machined from bar stock and the roll threads are tougher and more uniform than machined threads. This gives The Seng Company an adjust-

ment screw that works easily and helps produce a better chair at less cost.

This is not an isolated case with Townsend engineered parts and fasteners. It is typical of how Townsend helps save money and time by working closely with manufacturers in designing parts for many applications. Townsend parts and fasteners are cold headed, pointed, machined, drilled, slotted, trimmed, roll threaded, extruded, pierced, knurled, bent or flattened. They are produced in carbon, alloy and stainless steels—in brass, bronze, copper, aluminum—in a variety of platings and finishes.

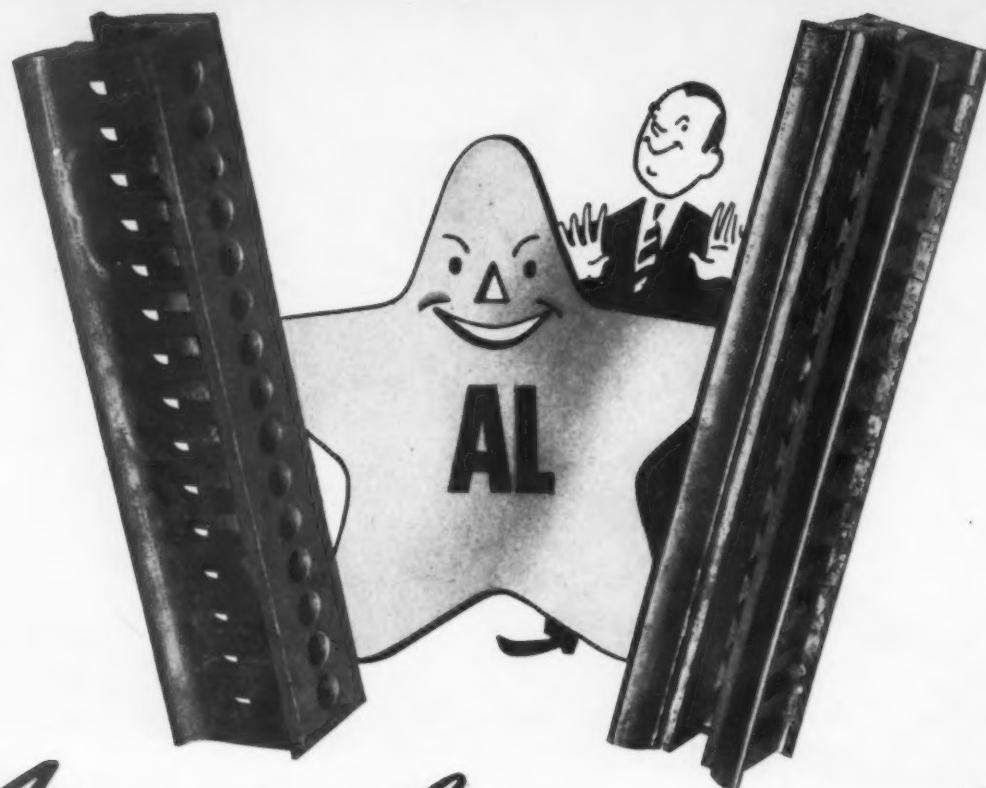
To find out how to reduce costs and improve your products with Townsend cold headed parts send us a sample or sketch of the parts you need. Our engineers will gladly give you an estimate without obligation.

Call or write today to:

Townsend

COMPANY — ESTABLISHED 1816

New Brighton, Pa.
Chicago 38, Ill.



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 (SAID THE USER)

from this Gang Milling Fixture made of AIRLOY

There's an
A-L Tool Steel
 to do each job best!



The Allegheny Ludlum Tool Steel family includes 37 principal types, covering the high speed, hot work, shock resisting, cold die, and carbon and low alloy steel fields. Let us help you find the best answer to *any* problem that occurs in your production or use of cutting and forming tools.

Address Dept. P-79

Particularly in view of the way it is cut up, the fixture shown above—made of A-L "AIRLOY" (a manganese-chrome-molybdenum air hardening cold die steel)—gave a performance that delighted the user, *and that's what counts!*

The fixture was designed to hold 15 small parts, 1/2" x 3/8", for milling a slot. In heat treatment, each fixture was first preheated at 1150° F., then raised to 1475° F. and held there for 7 to 8 minutes, then air cooled—resulting in a hardness of 62/63 Rockwell C. After a draw at 500° F., the final hardness was 57/58 C. Accurate measurement before and after heat treating revealed that there was *no change in sizes*.

AIRLOY is just one of eight principal types of A-L Cold Die Steels—hardenable from low temperatures, insuring low scale loss and freedom from cracking

and distortion. One of these types can help you, and our Technical Staff is always at your service—no obligation.

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TOOL STEEL DIVISION: DUNKIRK, N. Y.

Fine Tool Steels
Since 1854 W&D 1780



HARD DIRECT POUNDING



It takes less effort to strike straight direct blows with a Plumb ball pein hammer. It's balanced so perfectly that it swings a part of the arm. This assures accuracy, ease and force.

The cone-shaped pein is rounded to the exact curvature. It spreads rivets—doesn't mash or bend them. The weight is centered behind the striking face to add pounding power and lessen fatigue.

Like all Plumb tools the head is made of special analysis steel. And only tested, second growth hickory is used for the non-slipping comfort-grip handle.

The Plumb ball pein hammer does a better job with less effort.

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PLUMB

HAMMERS
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STEAM • HOT WATER • COLD WATER
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Fig. 123 is an exceptionally rugged valve... available with various types of discs especially compounded to give top results on the services for which they are recommended. Discs can be renewed or interchanged quick as a wink, insuring long-time satisfactory valve service with negligible maintenance expense. Disc holder is slip-on type, perfectly guided. Hexagon head gland is an aid to easy repacking. A further economy feature is the distinctive long-wearing stem material developed by Lunkhenheimer, eliminating stem-thread failure due to wear.

The "N-M-D" valve is also regularly available in angle, check and quick operating patterns. Circular No. 558, descriptive of the complete line, is yours for the asking.

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N. M. D. and other Lunkhenheimer Valves are available in all industrial centers. You can depend upon your Lunkhenheimer Distributor for prompt service on your requirements.

MOVING PICTURE ON MATERIALS HANDLING

"Fairfax and Fork Trucks" is the title of a 25 minute movie produced by the Clark Equipment Company, Industrial Truck Division, Battle Creek, Michigan, portraying modern material handling in the Fairfax Industrial District at Kansas City, Kans., a self-governing community composed of 80-odd business concerns. The picture is available on a loan basis.

PLANT MAINTENANCE SHOW AT CLEVELAND IN JANUARY

A Plant Maintenance Show is scheduled to be held in Cleveland, Ohio, on January 16-19, inclusive. It will be the first ever devoted exclusively to maintenance problems. Already some 50 companies have reserved space for the show and it is expected that several times that number will be represented when it opens.

Plant maintenance is characterized as being one of the biggest cost factors in production, and in some highly mechanized fields such as chemicals estimates place maintenance costs at three quarters of the total factory payroll. Plant maintenance involves all the factors which make production flow smoothly, and major stress at both the show and conference will be placed on cost reduction factors.

Equipment, services and materials to be exhibited will include air conditioning, heating, ventilating, building materials and service, maintenance tools and supplies, electrical equipment, instrumentation, lubricating equipment, materials handling equipment, paints, mechanical rubber goods, power transmission, and welding and gas cutting.

POOL-CATHODE MERCURY-ARC POWER CONVERTERS GUIDE

The new American Standard for Pool-Cathode Mercury-Arc Power Converters, ASA C34.1-1949, will be of outstanding value to those dealing with rectifiers and other electronic equipment used for power conversion purposes. It will serve both as a source of information and as a guide to terminology, circuits, test methods, and usual operating practices and conditions. The American Standard, sponsored by the American Institute of Electrical Engineers and recently approved by the American Standards Association, replaces the AIEE Number Six Report on Standards for Acceptance Tests for Metal Tank Mercury-Arc Rectifiers, dated 1934.

The new publication is divided into five parts covering: I Definitions; II Standards; III Test Code; IV Recommended Practice and Operating Guide; and V Rectifier Transformers.

The section on definitions gives precise meaning to a number of terms, many of which have come into use in the industry since 1934. Much of this new ter-

(Please turn to page 256)



Photos courtesy Surface Combustion Corp.



GIANT or DWARF



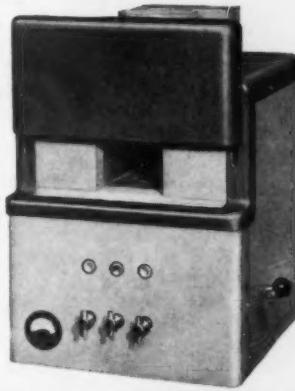
For lower operating costs, line your furnace with B&W Refractories

Minimizing maintenance and providing continuously superior performance are just two of the many ways B&W Refractories cut operating costs in all types of industrial furnaces—large or small.

In large malleableizing furnaces of the type shown above, the same B&W Refractories—after 11 years of continuous operation with high CO atmospheres—are still providing outstanding

ing service, despite the added strain placed on them during the rigorous war years.

In small laboratory furnaces, accurate temperature control and the ability to perform precise pilot operations which can later be duplicated—are essential factors in holding down overall costs. Because of their superior insulating qualities, B&W Insulating Firebrick are widely used for this precision work.



Your local B&W Representative will be glad to show how the use of B&W Refractories may be profitable in your furnace—large or small.

R-291



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B&W 80 FIREBRICK • B&W JUNIOR FIREBRICK
B&W 80 GLASS TANK BLOCKS • B&W INSULATING FIREBRICK
B&W REFRACTORY CASTABLES, PLASTICS AND MORTARS

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Chemical Recovery Units... Seamless, & Welded Tubes... Pulverizers
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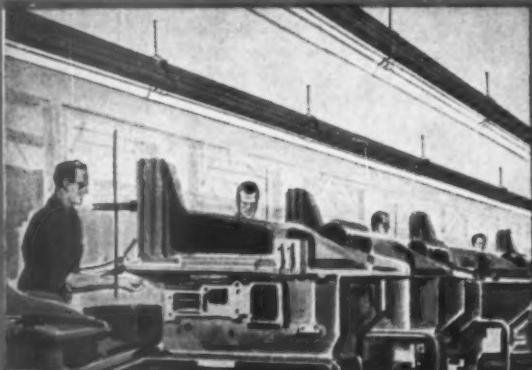
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11,000,000 Lamps in
Actual Service Prove
Your Lamp Dollar is Now
Worth Three with Sylvania's
Newest Fluorescent Lamps.



IN MANUFACTURING AREAS—you'll want the lamps that last 3 years or more in a single-shift operation. Better seeing, better working conditions, greater accuracy! (Fixture shown is HFFS-440.)



IN OFFICE AREAS—brighter light than ever before for a much longer period of time! Transforms office to the kind of easy-to-work place you've always wanted! (Fixture shown is CL-242.)

RATED TO LAST 3 TIMES AS LONG AS EVER BEFORE

At no increase in cost, Sylvania's new triple-life fluorescent lamps are now rated to last three times as long as ever before. To you, this can mean a saving of 66½ percent on lamp expense and an equally important saving on the labor cost of replacing lamps.

Made by a new process employing greatly improved phosphors, these lamps maintain their high light output and freedom from end darkening for a much longer time. Order today from your Sylvania distributor.

They last 7½ times as long as Electric Light Bulbs!



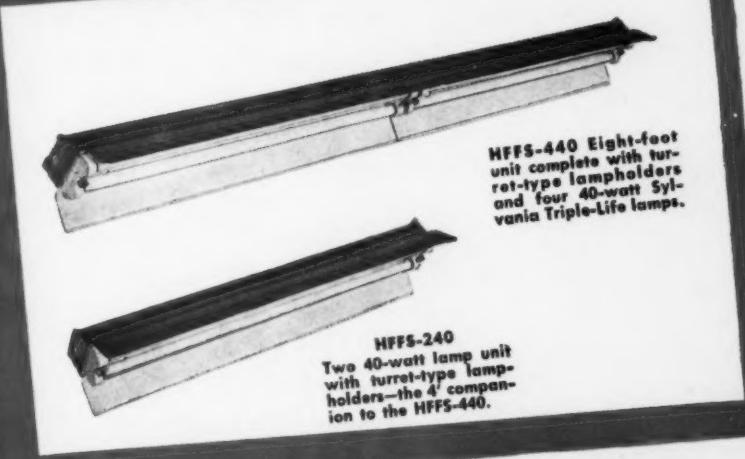
You know how long an ordinary electric light bulb lasts. Well, just think of the money saved by using these new lamps that last 7½ times as long!

Don't miss this opportunity to get lamps of unprecedented *long life* with greater light output—at no extra cost!

Here are the industrial fixtures you want for unbroken sweeps of light!

Now, from one end of the plant to the other, you can have a single sweep of light! Engineered specifically to meet the most exacting requirements, these HFFS-240 and HFFS-440 units have been designed to join with no apparent separation.

As with all Sylvania Fixtures, these units are the easiest to install and service. What's more, the long channels save time and money in installation. Send coupon for full information on these fixtures and the new Triple-Life lamps!



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Address.....

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Verdict for *COTO-COIL* on every count

Coto-Coil Windings bring you the best for the least.

Wherever electric or electronic controls are called for . . .

Wherever precision is a prime necessity . . .

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(Coalesced under W.E. Pats.)

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UNIVERSAL SINGLE OR

MULTI-PIE CROSS WOUND



COTO-COIL CO., INC.

COIL SPECIALISTS SINCE 1917

65 Pavillion Avenue, Providence 5, R. I.

(Continued from page 252)

minology arises from the use of phase control for varying the ratio of the d-c to a-c voltage and from the application of rectifiers for power inversion. Among the more important of the new terms defined are ignitron, excitron, rectifying device, single-way rectifier, double-way rectifier, commuting group, light transition load, initial inverse voltage, commuting reactance factor, arc-back, arc-thru, basic a-c voltage, ceiling d-c voltage, and d-c winding of a rectifier transformer. The names for a number of rectifier circuits have also been standardized, including diametric, wye, cross, star, and aster circuits as well as zig-zag and forked variations of these circuits.

Section III on Test Code outlines the method of measuring many quantities such as arc-drop loss, regulation, and efficiency.

A reference is included to a report on "Inductive Coordination Aspects of Rectifier Installations," (*AIEE Transactions*, vol. 65, p. 419, 1946), which was inspired by the work of the committee that developed the new standard. The report gives a very simple and useful treatment of inductive coordination as it relates to the a-c side of electronic power converters.

The fifth section, which is also included in the American Standards for Transformers, Regulators, and Reactors, C57, contains all material relating to rectifier transformers and reactors.

Copies of the American Standard for Pool-Cathode Mercury-Arc Power Converters, C34.1-1949, can be obtained from the American Institute of Electrical Engineers, publisher, 33 W. 39th St., New York, or from the American Standards Association 70 E. 45th St., New York, at \$1.20 each.

1 1 1

SYNTHETIC GAS, DIESEL OIL AND HEATING OIL CAN BE MADE FOR 8.4 TO 12 CENTS A GALLON

The cost of producing synthetic liquid fuels has dropped to the point where refined products, such as gasoline, diesel oil and heating oil, can be made from coal and oil shale for as little as 8.4 to 12 cents a gallon, according to W. C. Schroeder, chief of the Office of Synthetic Liquid Fuels, U. S. Bureau of Mines, who spoke at the semi-annual meeting of The American Society of Mechanical Engineers in San Francisco.

Intensive investigation carried out in recent years by industry and the Government has made the low production costs, he explained. Excluding profit and interest of the plant investment, he estimated that gasoline can be produced from coal at costs ranging from 9 to 12 cents per gallon. The plant investment would be between \$7,000 and \$8,500 for each barrel of capacity per day for plants of 10,000 barrels capacity and over, he said.

The cost of crude oil, again excluding interest on investment and profit, is approximately \$2 per barrel, Mr. Schroeder continued. From this, he estimated

(Please turn to page 258)

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There are

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1800 SIZES
of Perfect Oil Seals**

Among the 14 different types of Perfect Oil Seals, one or more will usually meet your sealing requirements, no matter how critical. Such conditions as shaft end movement—intermittent speeds—exceptional exposure to grit, dirt and moisture—extreme high speeds—very low speeds and other troublesome sealing requirements are adequately met by standard types of Perfect Oil Seals.

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B-RIGHT-ON SOCKET SCREW PRODUCTS

Uniform top-quality . . . that's the mark of B-Right-On Socket Screw Products. Best materials . . . most modern production methods . . . careful inspection keep Brighton Products up to that "Excellent" rating they've earned with wise buyers. Compare a pair . . . compare a hundred . . . Brighton Screws are Uni-Quality.



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**FREE SAMPLES
NO OBLIGATION . . .
JUST WRITE**

Specify Types
and sizes.



BRIGHTON
Screw & Mfg. Co.

1845 Reading Rd., Cincinnati 2, Ohio

(Continued from page 256)

that the cost of gasoline, diesel oil and heating oil made from the crude shale oil would be about 8.4 cents per gallon. Initial plant investment would be between \$4,000 and \$5,000 per barrel per day capacity, he added.

Mining Developments

Developments in mining and processing oil shale have been largely responsible for the low production cost of refined oil shale products, Mr. Shroeder pointed out.

"Developments in mechanized mining have shown that an astounding output per man is possible and that mining will be substantially less than 60 cents per ton of shale," he said. "In recent thirty-day tests, that output has exceeded 100 tons per man-day underground."

Progress in refining oil shale also has been substantial, he said, and indicates that 75 to 85 percent of crude shale oil can be converted economically into gasoline, heating oil and diesel fuel. Retorting of oil shale, while essentially a simple heating process, still needs considerable study to determine the most efficient equipment.

No Oil Shortage

Shortages of gasoline and fuel oil common during World War II and the immediate post-war period, are no longer a problem, Mr. Schröder told the engineers. In spite of high-level consumption, the petroleum industry has raised production fast enough to overtake demand and even provide some excess of oil products," he said.

"It does not follow, however, that domestic surpluses necessarily will be of long duration in the face of increasing consumption per capita and an increasing population," he cautioned. "In less than a decade, shortages of domestic petroleum can appear that would grow rapidly."

Four courses available to meet these shortages, he said, are importation of oil, secondary recovery, development of tidelands oil and development of synthetic liquid fuels.

Probably the most important of these is development of synthetic liquid fuels, he said. This would insure a liquid fuel supply independent of foreign sources and adequate for centuries, he explained, as well as provide a new American industry.

* * *

PRODUCTION TEST CLEANING SERVICE OFFERED BY MAGNUS CHEMICAL

The Magnus Chemical Co., Inc., Inc., Garwood, N. J., manufacturers of automotive and industrial cleaning chemicals and equipment, announce the inauguration of a free production test cleaning service. Tests are conducted under actual working conditions. The tests make it possible to determine not only the best chemicals, equipment and methods for achieving a desired cleaning result, but actual cleaning time and costs can be recorded.

(Please turn to page 22)

This is "IT!"

**A SNAP GAGE
THAT IS
WAY OUT
IN FRONT
AND AT A PRICE
THAT IS RIGHT**

For years you've seen snap gages—both with and without indicators—that really do not answer your needs. You've wanted a simple gage that was foolproof, rugged, and easy to handle—and at a right price. Here it is: Federal Model 1000! All our research, all our know-how in gage-making, all your wants, likes and dislikes, your demands and your gripes have been carefully considered to make this an outstanding Gage. Model 1000 is "IT", the right gage at the right price.

There are no tricky gadgets—Model 1000 is simple, easy to set and easy to use. It's rugged and fully guarded to withstand the roughest handling. It feels and handles like an old fashioned conventional gage but it's years ahead in design and performance. Model 1000 is completely new and up-to-date in every detail . . . newer even than any other Indicating Snap Gage.

Model 1000 has everything—visibility, positiveness, simplicity, lightness, toughness—it's dead to temperature changes and above all accurate. You'll like it when you see it and you'll like it more when you use it. No other Indicating Snap Gage can match Model 1000 in usefulness. Five sizes cover the full range from 0 to 6". Think of the number of old-style conventional gages each Model 1000 can replace—think of the savings, too!

Federal Model 1000 All-Purpose Snap Gage does a better job at less cost. Its price will surprise and please you. Send for complete descriptive bulletin and price of this definitely modern Snap Gage. Federal Products Corporation, 1106 I Eddy Street, Providence 1, R. I.



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In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's WISSCOLAY® Preformed. It lasts longer—is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope

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ON THE WEST COAST—The California Wire Cloth Corp.
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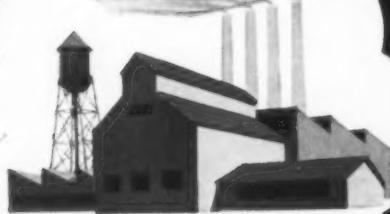
TRANSPORTATION



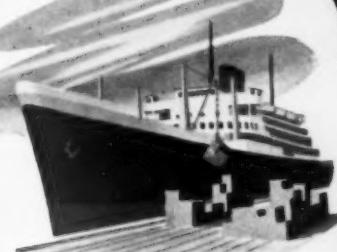
MINING



PETROLEUM



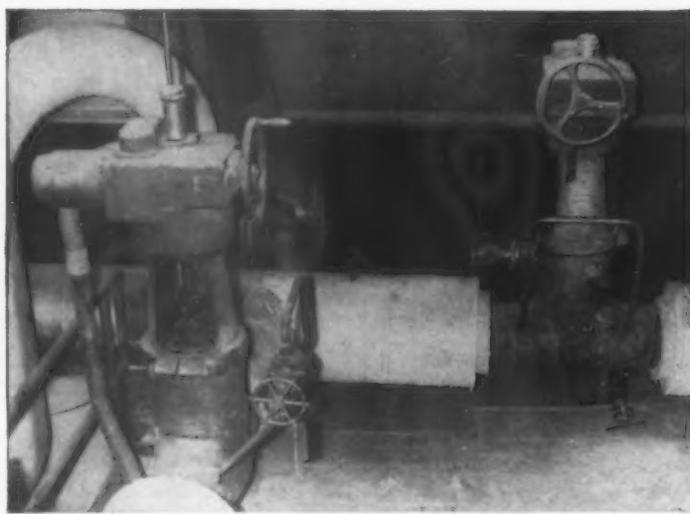
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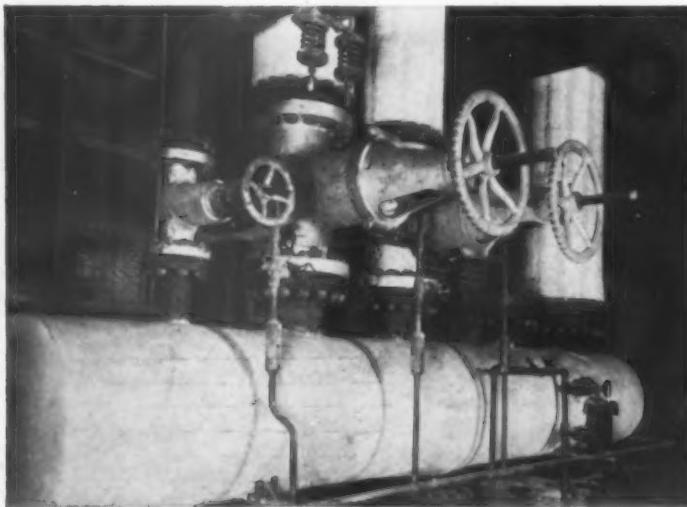
MARINE



CONSTRUCTION



Walworth Motor Operated Series 900 Pressure-Seal Cast Steel Gate Valves.



Walworth Series 600 Pressure-Seal Cast Steel Gate Valves.



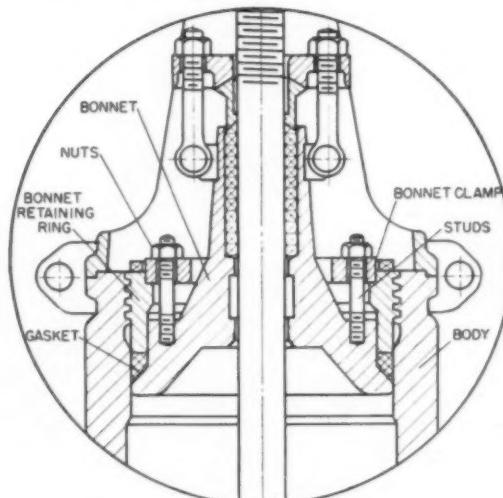
Manually operated and motor operated Walworth Series 900 Pressure-Seal Cast Steel Gate Valves.

WALWORTH PRESSURE-SEAL CAST STEEL VALVES

The bonnet and body design of Walworth Pressure-Seal Valves is such that the pressure within the valve is used to prevent leakage at the junction of the bonnet and body. Sudden temperature and pressure changes do not affect this tightness. Bonnet flanges and studs are eliminated and the weight of the valve is reduced.

An improved disc design provides flexibility, and helps keep seats tight, even when the valve body may be distorted by pipeline stresses, or by temperature and pressure changes. This improved disc design makes it easier to open and close this valve.

Walworth Pressure-Seal Valves are easy to disassemble and assemble, and are the most satisfactory valves for high-pressure, high-temperature service. They are available in Series 600, 900, and 1500 and in a wide range of sizes and types. For further information, see your nearest Walworth Distributor, or write: Walworth Company, 60 East 42nd Street, New York 17, N. Y.



A cross section of the bonnet joint assembly of a Walworth Pressure-Seal Cast Steel Gate Valve. The internal pressure is utilized to make the body-to-bonnet joint tight.

WALWORTH valves and fittings

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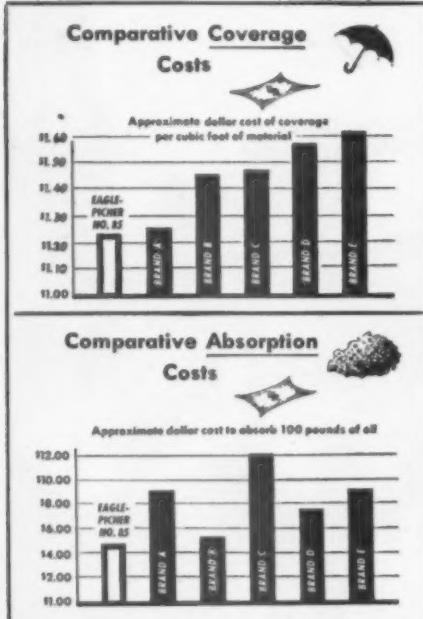
SEPTEMBER, 1949

Want Additional Product Information? See Page 19.

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Here's proof

**Eagle-Picher
Floor-Dry No. 85 gives you
More for your
dollar!**



Comparative scientific tests show that Eagle-Picher Industrial Floor-Dry #85 outperforms the five other leading brands of floor drying compounds.

Eagle-Picher Industrial Floor-Dry #85 is a granular mineral compound—chemically inert, non-combustible and insoluble in oil, grease, kerosene or water. It can give you positive reduction in operating costs plus greater safety. Write for complete information.

Packed in convenient 50-pound, multi-wall Kraft paper bags.

The Eagle-Picher Company

GENERAL OFFICES: CINCINNATI (1), OHIO

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Department P-99
Cincinnati (1), Ohio
Gentlemen: Please send me complete
information about Eagle-Picher Indus-
trial Floor-Dry No. 85.

Name _____
Address _____
City _____ County _____ State _____



CLEVELAND TWIST DRILL REDESIGNS END MILLS

The Cleveland Twist Drill Company, Cleveland, O., is introducing a redesigned line of end mills, incorporating many new and distinctive features, that are said to result in a tool that has strength, speed and accuracy to a degree not previously possible.

Users of the new end mills are reported to have less breakage, many more cuts per grind, consistent accuracy, and up to 50% increase in feed.



The major design features that distinguish the new end mills are: Re-designed flutes are machine polished. There are no pockets and chips are free to move. New clearance and accurate machine polish of flutes result in closer control of size. No sharp corners or points where localization of stresses might occur. New-style clearance supports the cutting edge, assures against "flaking" or "chipping out." Radically new flute shape and chip clearing ability reduce wear on the cutting edge, thus maintaining consistent accuracy. New flute shape gives maximum cutting qualities at increased rates of feed.

50% SAVING ON PLASTIC KNOB ASSEMBLY

Savings up to 50 per cent in the assembly of plastic knobs can be accomplished through a unique application of Push-on type Speed Nuts, according to Tinnerman Products, Inc., 205 Fulton Road, Cleveland, O.

Applicable in most assemblies requiring the attachment of a plastic knob to a round shaft, the method was developed by the Lovell Manufacturing Co., Tinnerman Products and Perry Plastics Co., for washing machine wringer knobs.

After consultation with Tinnerman and Perry Plastics engineers, the Lovell knob was designed so it was molded in two parts. The cap of the knob contains a cylindrical cavity inside which the round, push-on Speed Nut is inserted. The two knob sections then are cemented together, holding the Speed Nut securely in position.

The completed knob then is merely pushed on the shaft in the final assembly and is held firmly in place by the Speed Nut. According to Lovell engineers, the use of the Speed Nut created savings of 50 per cent over the original design.

(Please turn to page 266)



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"I've been buying
dependable Phillips single
stroke hand operated Barrel Pumps
for 30 years . . . they sure save time and
prevent waste."

Model 174—gallon stroke, quantity stops, adjustable suction. Threaded for 1½ and 2" drum openings.

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Model 19—quart stroke, swing return drain. Threaded for 1½ and 2" openings.



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Model 81—gallon stroke pump, 65 gallon tank 20 x 27 x 30" high, 16 gauge steel—ideal for battery installation. Can be supplied with casters or dolly to move where needed. Other sizes available.

Can be plated to handle corrosive liquids.

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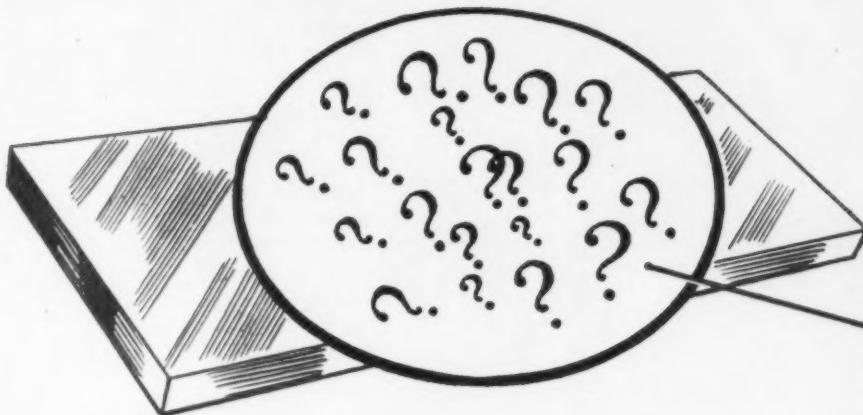
PHILLIPS PUMP & TANK CO.



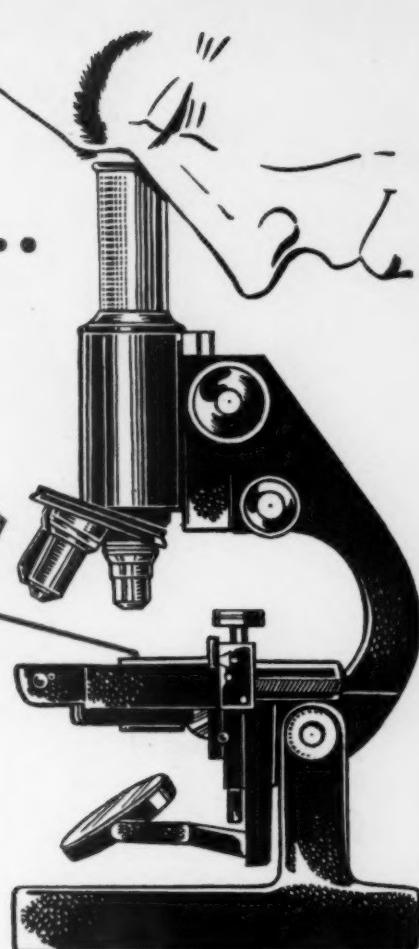
5030 Brotherton Rd.

Cincinnati 9, Ohio

Before you buy automatic plating equipment...



**look close
at these questions:**



There's a lot more to wise purchasing of plating equipment

for your plant than picking the lowest quotation

Ask if the plating room will be tied up a long time during installation, cutting your work volume down and costing you money. Udylite machines may be shipped ready to run, and can usually be installed over the week-end.

Ask if it is good business to purchase a knocked-down model which must be re-assembled in your plant. Udylite machines, shipped already assembled, can be moved through most doorways, using only a few machinery movers instead of requiring many movers and often millwrights to assemble the sections.

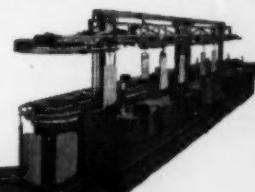
Ask if you are going to run into transportation problems by ordering the machine. Udylite builds machines less than 11 ft. wide which may be shipped anywhere. (Railroads can route a car almost anywhere if less than 11 ft. wide; highway trucks in many states are also limited to 11 ft. Wider machines cannot be shipped assembled.)

Ask how much working space is required. Load and unload space is often a problem around a machine. With the Udylite machines space requirements are held to a minimum and the racks are within easy reach.

Ask if the maintenance cost factor has been considered. Udylite machines have astonished users with their low maintenance cost. The mechanism is simple and easy to get at; any shop mechanic can understand it and keep it in fine running order.

Ask any Udylite Technical Man for the real comparative story and he will show you short and quick what is your best buy and the REASONS WHY. Udylite Technical Men have been serving the plating industry for many years with practical advice based on long experience. Call us before you make your decision.

Shown here is the Udylite Fully Automatic Plating Machine which gives you the multiple benefits described on this page.

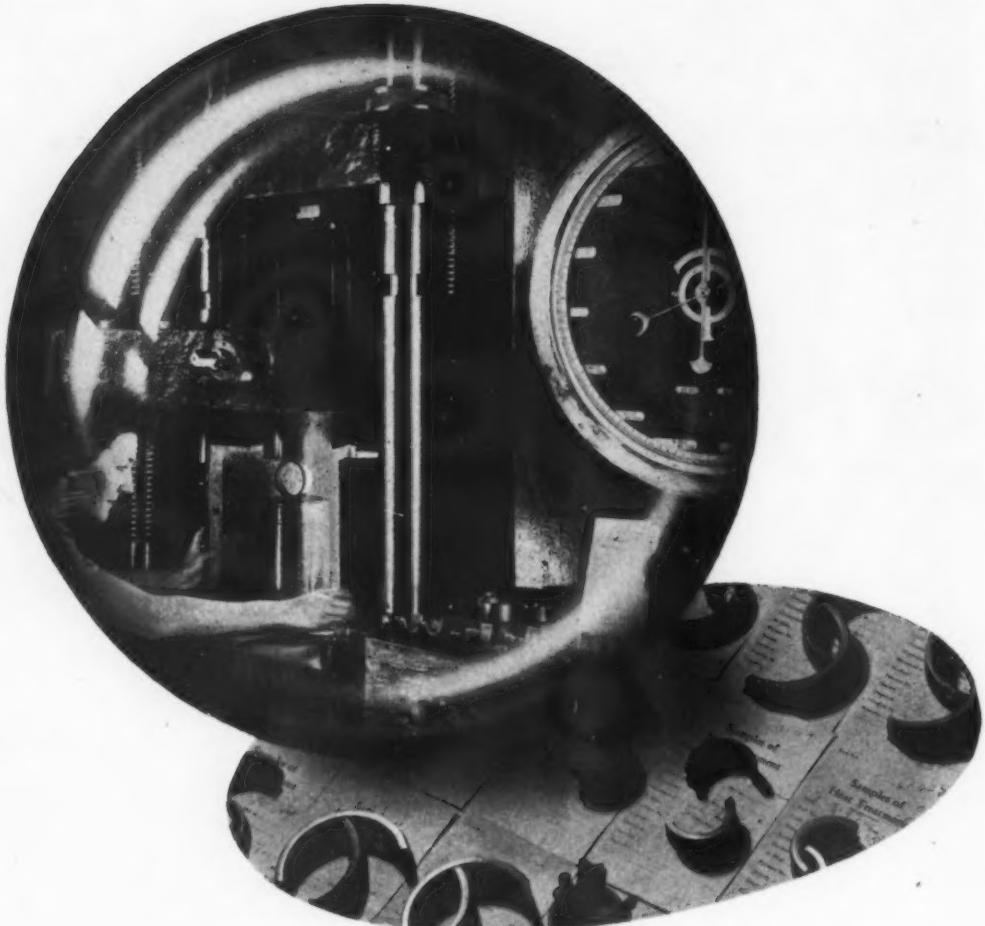


THE
Udylite
CORPORATION

PIONEER
OF A
BETTER WAY
IN PLATING

DETROIT 11, MICHIGAN

Fractured for safety



These bearing parts are part of a day's vital statistics in Federal's "bureau of standards." Here race rings and balls are crush-tested after hardening to determine their load bearing strength, etch tested for any minute cracks in the fracture and Rockwell checked for hardness.

Conditioning a Federal Ball Bearing to deliver the right degree of resilience, toughness and resistance to compression and distortion starts with hardening the race rings *right through to the core* to withstand the severe pressure of the ball on the ball track, particularly under heavy load. Automatic electric controls insure a uniform heat-treat throughout the entire Federal hardening cycle. The silky fracture

tells the "inside" story in inspection; performance proves it.

Every fourth operator is an inspector at Federal during the more than 100 individual manufacturing, inspection and cleaning operations that go into every Federal Bearing.

There's a size and type that fits your application in the Federal line. Our Catalogue "K" describes them all. May we send you a copy?

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Makers of Fine Ball Bearings

REPRESENTATIVES LOCATED AT

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Chester-Twelfth Building, Cleveland 14, Ohio



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All production machinery will last longer — give better service — if the proper lubricant is used. That's why you will find it profitable to use high quality Tycol oils and greases in your plant.

There's a reason! No matter what your lubricating need — *EXTREME PRESSURE, high or low temperature, high speed or any other service condition — there's a Tycol oil or grease suited to your specific requirements.

Refined from the highest grade crudes, Tycol lubricants are exceptionally resistant to breakdown which means greater economy . . . longer machine life for every type of equipment.

Tide Water Associated will gladly recommend the Tycol lubricant that meets your particular requirements. Call, write or wire your nearest Tide Water Associated office today.



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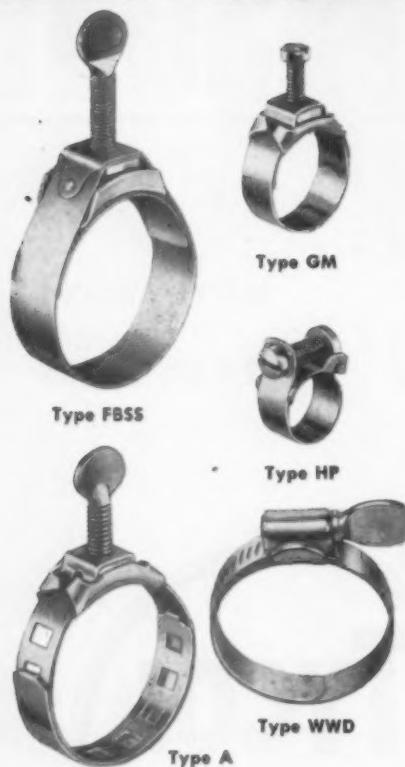


*LEARN WHAT THIS PRODUCT CHARACTERISTIC MEANS TO YOU — READ "LUBRICANIA"
This informative handbook, "Tide Water Associated Lubricania," gives clear, concise descriptions of the basic tests used to determine important properties of oils and greases. For your free copy, write to Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

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For Any
Hose Connection



Whatever your hose connection requirement, there is a Wittek Hose Clamp to meet the need. Wittek Hose Clamps are made in many sizes and styles, and of various materials such as stainless steel, regular steel or brass. Each type of Wittek Hose Clamp is of proven design which assures dependable leakproof hose connection.

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MANUFACTURING CO.
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Dependability in Hose Clamps for Over
a Quarter of a Century

NEW PACKING STANDARDS REDUCE NUMBER OF SIZES AND INVENTORIES

Following participation in the Joint Industry Conference on Hydraulic Packings and Seals, E. F. Houghton & Co. of Philadelphia has prepared a booklet listing standards for leather and synthetic rubber packings. The standards serve to simplify the selection of packings by reducing the number of sizes and thereby cut down inventories. Interchangeability and easy identification are facilitated by establishment of dash numbers.

Army-Navy standards set up during the war represented the first efforts towards such standardization, but in the opinion of the trade today, it is said, do not go far enough nor cover enough types of packings. For example AN-6225 standards included 80 sizes, which by Joint Industry Conference action has already been reduced to 49. Increment increases in I.D. size table have been agreed upon by the conference and will be generally adopted.

The new booklet lists standards based on discussion at the J.I.C. meetings. The Mechanical Packing Division of the leading rubber packing suppliers have agreed to follow both the new standards and the marking codes, it is reported.

The book serves as a supplement to the company's handbooks on leather and synthetic rubber packings, and copy is available on request. The books are being revised to include the new standards.

USE OF RUBBER IN HIGHWAY CONSTRUCTION

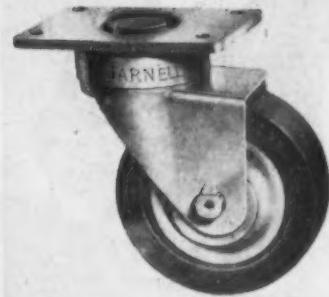
Laboratory and highway tests indicate that the use of rubber powder in asphalt mixtures greatly improves the durability of black-top highways and reduces maintenance costs, according to the Firestone Tire & Rubber Company. Such roads have been laid in Ohio, Virginia, Minnesota and Texas, and are being considered by other states.

Rubber powder binds the asphalt more tightly into the road. In hot weather it retards melting and tends to prevent the softening and breaking down of the pavement under heavy usage. In cold weather the rubber retards contraction and tends to prevent water and frost from permeating and disintegrating the road surface.

Other advantages of the rubber road are: Improved non-skid characteristics which mean safer roads; and, resiliency that prevents road surface from shattering under heavy truck-load impacts, which means lower highway maintenance costs.

Experimental work on rubber roads was initiated approximately fifteen years ago but was halted by urgent war demands for rubber. Recently, Firestone has helped revive interest in rubber roads by using powdered rubber in test road installations. To date, test roads in the country have been laid with natural, scrap and synthetic rubber mixtures.

(Please turn to page 268)



**THERE'S NO
QUESTION
ABOUT IT !**

**Darnell
Casters**

**KEEP
TURNING
AND
EARNING**

Free Manual

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Your Roebling Field Man will gladly help you choose the best wire—round, flat or shaped—for utmost efficiency and economy in your products. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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SION PRODUCTION
OF 4-CYCLE
SINGLE-CYLINDER
AIR-COOLED
ENGINES



The experience gained in building more than 4 million air-cooled 4-cycle gasoline engines—during 30 years of uninterrupted production—plus the knowledge acquired in putting air-cooled power to work on all types of equipment, machinery and appliances—for civilian and military uses—in industry, construction, by railroads and on farms—all this broad technical background has kept Briggs & Stratton always *first* in modern design and advanced features.

The best in modern development—best methods of precision construction—the best procedures in laboratory and field testing—most complete manufacturing facilities—these are all present and basic in Briggs & Stratton engine building. For all that is best in design, features and performance in air-cooled power, manufacturers, dealers, and users look to Briggs & Stratton.

BRIGGS & STRATTON CORP., Milwaukee 1, Wis., U.S.A.



"STALLITE NO. 869"—A NEW PLASTICIZED-RUBBER COMPOUND

The Stalwart Rubber Company, Bedford, Ohio, announces the development of a new plasticized-rubber compound, Stal-lite 869, which combines the outstanding characteristics of rubber and plastics. This new material is recommended for use in the fabrication of tool handles, foot treadles, mallet heads, toys, vacuum cleaner accessories, and many other items intended for applications which require an extremely durable, wear-resistant rubber. It also can be used to replace certain types of metal parts.

Stal-lite 869 has a durometer hardness



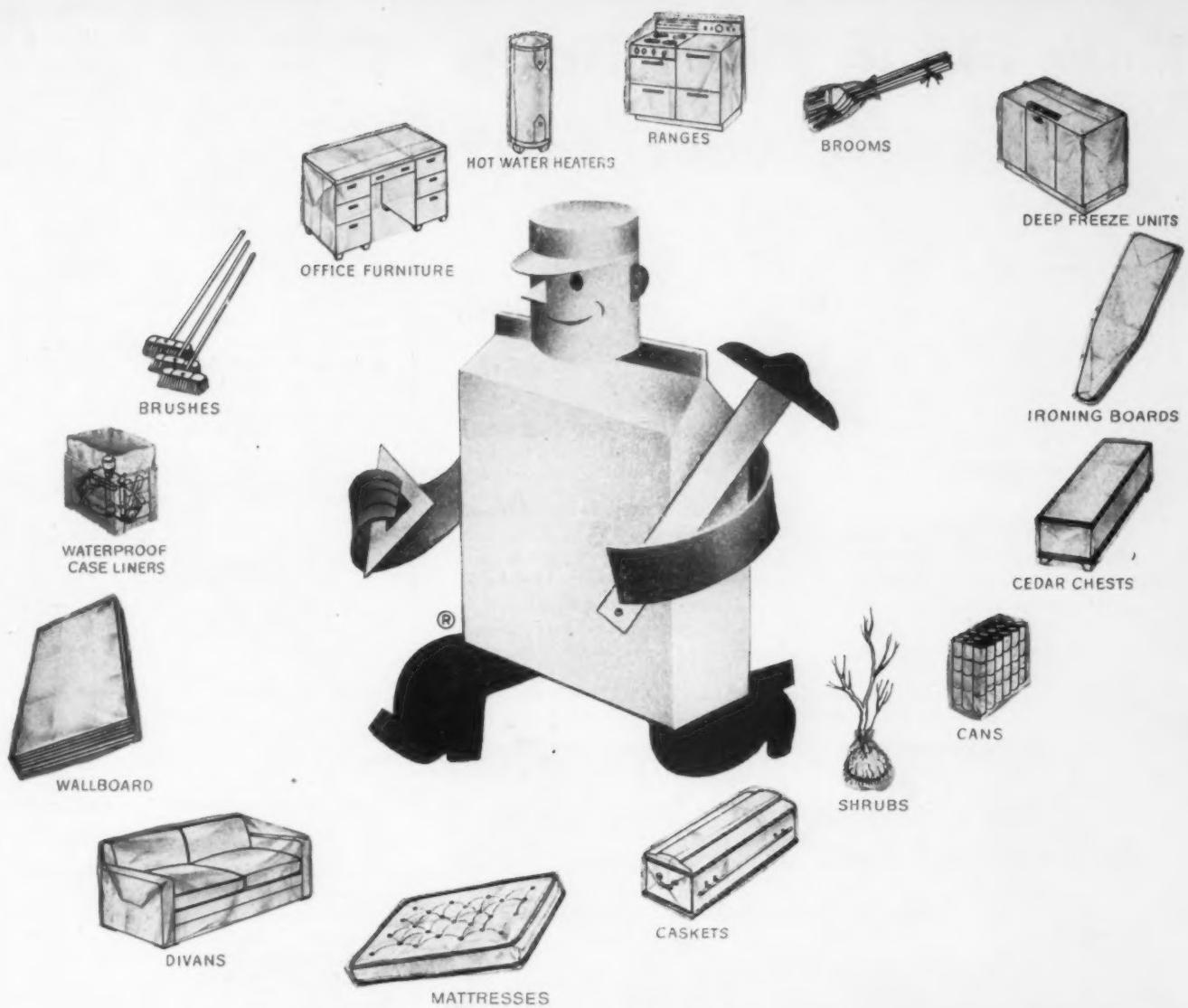
of 95 and tensile strength of 1854 pounds per square inch, and it will withstand temperatures ranging from 0° to 250° Fahrenheit. Resilient and flexible despite its high durometer hardness, it features high impact strength, corrosion resistance, and light weight. Secondary drilling and machining operations can be performed on parts fabricated from this new compound. Present stocks are black in color. Parts can be painted for decorative applications.

The company is prepared to fabricate all types of molded parts from this new plasticized-rubber compound and to supply them in either limited or production quantities.

APPARATUS FOR CLEANING METAL-CONTAMINATED MERCURY

The cleaning of metal-contaminated mercury is made easy by apparatus known as the Mercury Oxifier recently introduced by the Bethlehem Apparatus Co., Hellertown, Pa. The oxifier consists of a glass drum into which the mercury is poured, with an agitator, electric motor, and receptacle to hold the clean mercury. All that the operator must normally do is to flick the motor switch and let the agitator run for several hours. After cleaning, the mercury is said to be suitable for use in precise instruments, and in general wherever high purity is desirable. The process cuts the cleaning time required by vacuum distillation or the nitric tower process. The manufacturer states that because of the convenience, efficiency and economy of the oxifier, commercial users will find it desirable to oxidize all the mercury they receive, and that for many purposes they will find a great saving in using prime virgin mercury so treated, instead of purchasing triple-distilled mercury.

(Please turn to page 270)



TAKES THE RAP OUT OF WRAPPING

BEMIS PAPER SPECIALTY MAN—He has more clever ways than a magician when it comes to cutting packaging costs. If you now wrap in paper, it's likely he can show you practical ways to convert to special paper bags . . . some with self-seal closures . . . that can save packing time in your plant and lower packing and shipping costs for you.

Shown here are just a few of the products that use Bemis paper specialty packaging to a big advantage. They illustrate the almost limitless versatility of Bemis engineers.

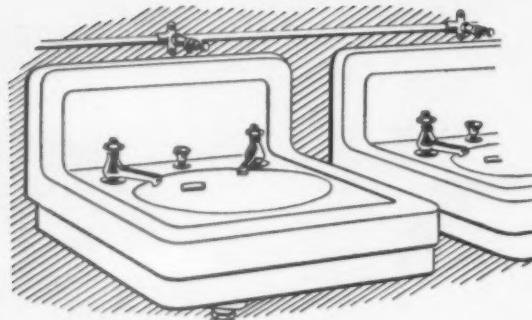
Bemis

Paper Specialty Plants
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Albion, New York



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- Could you suggest a more economical package that would be suitable for our product?
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How Much Does Soap Really Cost You?



**Not
cost per gallon...**

**But
cost per person!**

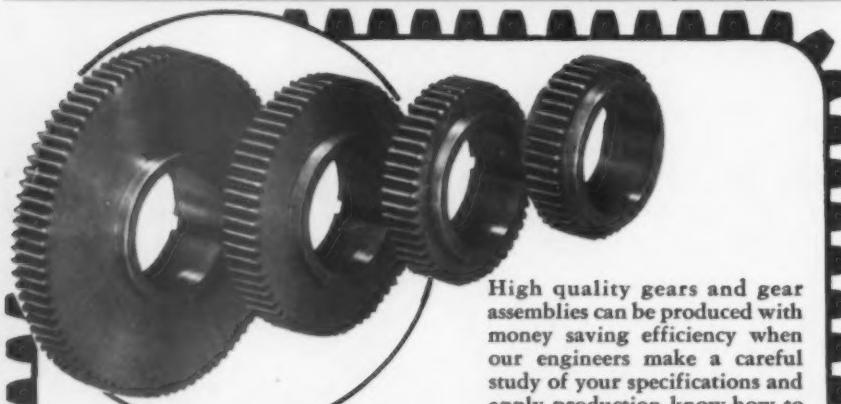
THE PROPER USE of soap in washrooms will effect important savings in your present maintenance cost. Gerson-Stewart's practical plan of Systematized Sanitation not only furnishes the finest quality products,

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High quality gears and gear assemblies can be produced with money saving efficiency when our engineers make a careful study of your specifications and apply production know-how to your requirements.

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GASOLINE USED BY PASSENGER CARS SATISFACTORY FOR TRUCKS

Gasoline customarily used in and generally available for passenger cars satisfactorily meets the anti-knock fuel requirements of commercial motor vehicles, it was reported at the SAE National West Coast Meeting in Portland.

The report was based upon a survey, conducted by four research laboratories and covering more than 100 buses, trucks, and truck-trailer combinations used in commercial operations in various sections of the country. The survey was said to have disclosed that while commercial-vehicle engines have somewhat lower anti-knock requirements at high speed and tend to rate the anti-knock value of sensitive fuels slightly lower than passenger-car engines, the fuel requirements of both types are quite similar. The survey further revealed that proper adjustment of ignition systems to manufacturers' specifications is highly critical in the case of commercial-vehicle engines and that operators can expect better service if more attention is given to maintenance of these parts.

Compared Results with 1948 Passenger Car Survey

Major object of the survey was to compare results with a similar survey of passenger car engines made in 1948 and thereby to ascertain the fuel anti-knock requirements of commercial vehicles. Twelve different makes of commercial vehicles, operating in city and intercity bus service, and in tank, van, light panel, utility, dump, and pick-up truck services, were tested in the vicinities of New York and Albany, N. Y.; Boston, Mass.; Philadelphia, Pa.; Cincinnati, Ohio; St. Louis, Mo.; and San Bernardino and San Francisco, Calif. The vehicles were tested both on reference fuels and commercial-type gasolines, first in an "as-found" condition and then after new distributors had been installed, worn parts replaced, and ignition systems adjusted to manufacturers' specifications and recommendations.

The report was prepared jointly for presentation at the meeting by J. A. Edgar, of Shell Oil Co., Martinez, Calif.; H. J. Gibson, of Ethyl Corporation, Detroit, Mich.; R. J. Greenshields, of Shell Oil Co., Wood River, Ill.; and G. W. Pusack, of Socony-Vacuum Oil Co., Inc., Paulsboro, N. J. The survey, which required more than 100 man-hours of work, was carried out by using vehicles of different sizes and makes in operation in various services in different sections of the country, with the basic idea of ascertaining whether, in view of the trend toward more sensitive gasolines for passenger cars, these same fuels could be used to advantage in motor buses and trucks. Commercial vehicles were said to consume about 25 per cent of the gasoline sold in the domestic market, with trucks in heavy-duty operation using about 11 per cent, buses about two per cent, and farm trucks and light commercial vehicles the remainder.

(Please turn to page 272)

WOULD A "HAND-PICKED" SPRING STEEL ...reduce your rejects?

If you have a high reject problem where you use spring steel, it might pay you to check with Sandvik.

Sandvik has a wide variety of special, high carbon and alloy steels . . . each "tailored" by analysis, gauge, width and finish for a specific range of service. From Sandvik, you can probably get a steel that "fits" your application to a "T". That means less production waste, better product performance.

Whenever you require greater fatigue life, finer surface finish, more accurate and uniform gauge or special physical properties in spring steel, talk it over with Sandvik.

- In straight carbon and alloy grades
- In special analyses for specific applications
- Annealed, unannealed or hardened or tempered
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Phone or write for further information or technical advice.



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pressor Valve Steel • Doctor
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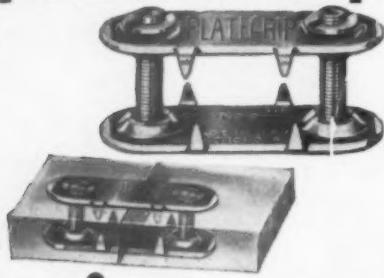
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PLATE FASTENERS FOR CONVEYOR BELTS



- Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from $1/8"$ to $1\frac{1}{2}"$ thickness. Write for Catalog Sheet.

Also repair plates for mending belts.

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Accuracy is a matter of Tolerances not Size



There may have been a time when to be accurate a lathe had to be massive, cumbersome and expensive. That is not true today.

Accuracy is essentially a matter of tolerances not mass, and today the very finest of spindle bearings (Timken Zero Precision Tapered Roller Bearings — run out accuracy within .00015) are found on SHELDON Precision Lathes. Beds of these 10", 11" and 12" SHELDON Lathes are held to within .0005" per foot of both parallel and longitudinal alignment while the lead screws are held within a tolerance of lead error of .0005" in any inch. Rigidity is obtained by improved engineering, — by placement of mass rather than sheer bulk.

Advances in machine tool building art, special machines, jigs and fixtures produce uniformly excellent SHELDON Precision Lathes in quantities that permit low selling prices. Larger collet capacities and increased power at the cutting point enable these more-profitable-to-operate lathes to take over much work heretofore requiring larger and more costly equipment.

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ANNOUNCE AVAILABILITY OF DURIMET SHEET AND PLATE

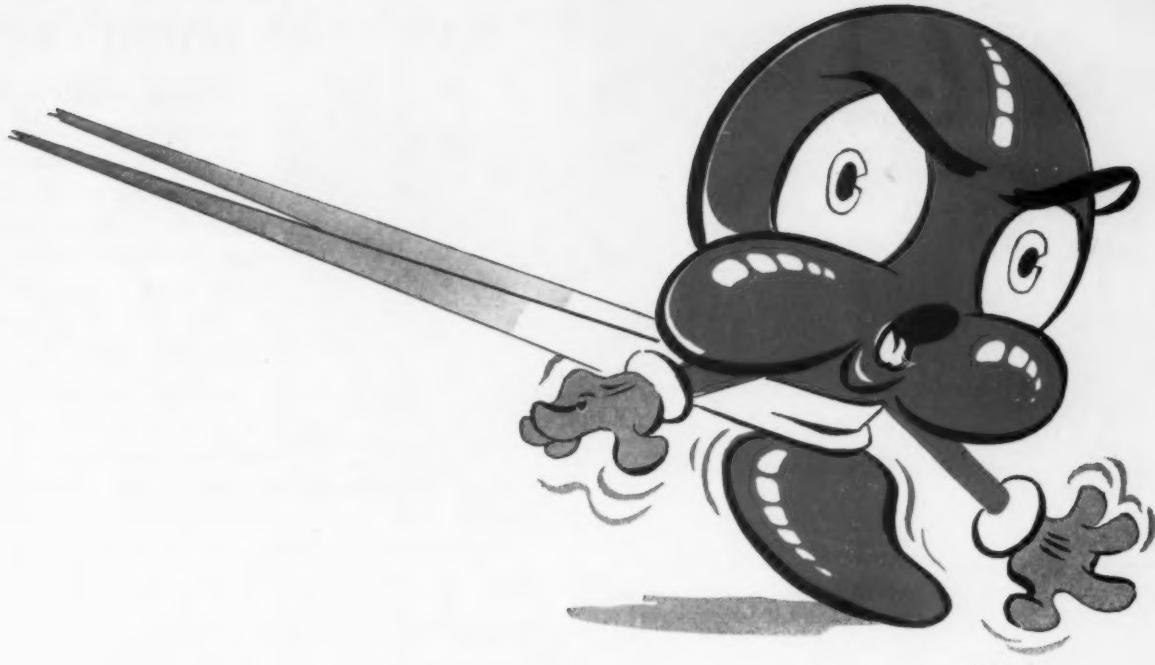
Announcement is made by Duriron Company, Inc., of the availability of Durimet 20 sheet and plate. The Durimet 20 analysis was developed during the war for severe corrosive applications that the standard 18-8 stainless steels will not withstand, the most notable and widespread application being for the handling of sulphuric acid, according to The Duriron Co. Durimet 20 can be satisfactorily applied to corrosive services formerly uneconomically handled by non-metallics of insufficient strength or heat transfer, or by extremely high priced metals, or by low priced metals with short life, it is stated. While higher in price than ordinary stainless steels it is said that it outlasts them 100 to 1 in some services, or simply indefinitely. Production is confined chiefly to gauges 24 to 11 and to the smaller thicknesses of plate. The range is from 24 gauge to $\frac{3}{4}$ " plate. Bulletin 502 details Durimet 20.

SUPPLEMENT TO SCREW-THREAD STANDARDS FOR FEDERAL SERVICES

A Supplement to hand Handbook H28 (1944), *Screw-Thread Standards for Federal Services*, has just been issued by the National Bureau of Standards and is available from the U. S. Government Printing Office. This publication makes effective a number of changes in American screw thread standards which have been adopted by the Interdepartmental Screw Thread Committee of the Federal Government since publication of the 1944 edition. Those revisions and additions which had been approved at the time of going to press by Sectional Committees B1, B2, and B18 of the American Standards Association are included in the Supplement.

Changes are given for sections of the Handbook dealing with American National form of thread; American National thread series; screw threads of special diameters, pitches, and lengths of engagement; American standard pipe threads, miscellaneous standardized product threads of American National form or American standard pipe thread form, and acme threads. Also included in the Supplement is an extensive appendix which contains descriptive material, charts, and tables of the Unified standards which were the subject of the recent signing of an accord for unification of American, British, and Canadian standard systems of screw threads.

Supplement to Handbook H28 (1944), *Screw-Thread Standards for Federal Services*, 57 large double-column pages, 28 tables, 14 figures, 25 cents a copy, available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Remittances from foreign countries must be in United States exchange and must include an additional sum of one-third the publication price to cover mailing costs.



How to reduce your

waste line

(waste pipe lines, that is!)

And there's plenty of loss—escaping heat energy—where there is no insulation! If you let BTUs escape, you are wasting money.

Carey Trims Fat Figures! Dollars assigned to production of heat energy are wasted when BTUs are on the loose. The best way to cut fat cost figures and keep BTUs in harness is to locate and eliminate leaks in heat energy.

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1. Experience gained from development of industrial insulation jobs of all kinds and sizes. At Carey—your problem has been solved before.
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Write for your FREE Copy of "Heat Insulation for Industry." This helpful booklet is an excellent guide to selection of industrial insulation—contains specifications and tables you'll want. For your free copy, address your request to Dept. PU9—The Philip Carey Manufacturing Company—Cincinnati 15, Ohio. In Canada: The Philip Carey Manufacturing Company, Ltd.—1557 MacKay Street—Montreal 25, P. Q.

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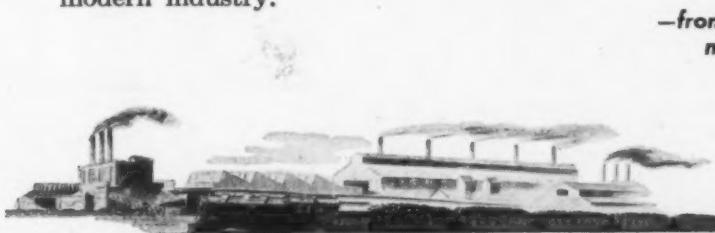
Bituminous is basic—the main-spring of America's might. Far-thinking executives—those who study existing facts, consider long-term possibilities, and prepare for emergencies—know this. So the vital decision so often made is, "build for bituminous."

Amid the uncertainties of the future is this fact: In the area served by the Baltimore & Ohio, lie vast, untapped reserves of excellent bituminous coals. They're in wide variety, and highly mechanized mines can produce them properly prepared for every requirement of modern industry.

Year after year, tireless research has made bituminous increasingly dynamic. Its further possibilities are tremendous. B&O, too, is constantly seeking better ways of serving the bituminous industry and its customers. More than \$80,000,000 has been spent in the last three years to improve B&O facilities for bituminous distribution. Here's real help for bituminous in guaranteeing the greatness of American industry for years to come. *Ask our man!*

BITUMINOUS COALS FOR EVERY PURPOSE

—from modern
mines like
this→



BALTIMORE & OHIO RAILROAD

Constantly doing things—better!

PERSONALITIES

in the NEWS

Martin F. Rummel has assumed the procurement responsibilities at the Pontiac Motor Division, General Motors Corp., Pontiac, Mich., formerly handled by Frank J. McLaughlin.



Martin F. Rummel

Mr. McLaughlin, who held the post of executive assistant to the general manager of the division, has resigned to operate his own Pontiac agency in Detroit. He became purchasing agent at Pontiac in 1932 after 22 years' purchasing experience with various automobile companies. He was assigned to the executive assistant post in 1940, serving as purchasing expert, expeditor and material chief during the difficult wartime and postwar years.

Leslie H. Peters has been named Manager of Purchases for Baker & Hamilton, San Francisco, Calif. He succeeds Charles Sharrocks, Vice President in Charge of Purchasing, who has retired after 63 years of service.

James J. Sears has been elected Vice President in Charge of Purchases of the Rock-Ola Mfg. Corp., Chicago, Ill. He has been with the company since 1933.

J. D. Carter has been named Assistant General Purchasing Agent for the western division of Kennecott Copper Corporation, at Salt Lake City, Utah.

Mr. Carter will retain his title and duties as Assistant Purchasing Agent, handling purchases for the Utah copper division, and in addition will coordinate purchasing activities of Kennecott's other mining divisions in Nevada, Arizona and New Mexico.

Carl A. Ilgenfritz, Vice President-Purchases of the United States Steel Corporation, Pittsburgh, Pa., has been nominated by President Truman as Chairman of the Munitions Board.

Mr. Ilgenfritz began his business career as a storekeeper with the Youngstown Sheet and Tube Co., later serving in the mechanical department. In 1913 he joined the engineering department of the Brier Hill Steel Co., becoming Assistant Purchasing Agent in 1917 and Purchasing Agent a year later. Subsequently he organized the Stroh-Ilgenfritz Co., Youngstown, O., dealers in coal, coke, pig iron and alloys. He resigned as Vice President of the concern in 1924 and became Assistant Purchasing Agent for Youngstown Sheet and Tube Co.



Carl A. Ilgenfritz

He was named General Purchasing agent for the United Alloy Steel Corp. at Canton, O., in 1925, and the following year became Director of Purchases for Central Alloy Steel Corp., Massillon, O. When Republic Steel Corp. was organized in 1930 by the merger of Republic Iron and Steel Co., Central Alloy Steel Corp., and other producers, he became Director of Purchases and Raw Materials.

In September, 1945, Mr. Ilgenfritz joined the Carnegie-Illinois Steel Corp., a United States Steel subsidiary, as Vice President in Charge of Purchases. In December, 1946, he assumed the same position with the United States Steel Corporation of Delaware.

Mr. Ilgenfritz has also been acting as advisor to the Federal Bureau of Supply, and with the Hoover Commission on Organization of the Executive Branch of the Government.

John Soelch has been named Director of Purchases for the Studebaker Corporation, South Bend, Ind. Mr. Soelch succeeds C. N. Rhoutsong, who is now on an indefinite leave of absence from Studebaker after having resigned his post because of ill health.

Robert Logas has been appointed Purchasing Agent, Stacey-Dresser Engineering, Cleveland, O. He had been Assistant Purchasing Agent.

Paul S. Killian has been appointed Vice President in Charge of Purchasing, Bethlehem Steel Company, Bethlehem, Pa., succeeding the late Charles R. Holton.

Mr. Killian, who attended the Wharton School of the University of Pennsylvania, joined Bethlehem in 1917 and has served in various capacities in the purchasing department. He was elected purchasing agent of the company in January, 1944. During the war he dealt with many unusual problems in the procurement of equipment and strategic materials for the company's expansion and its production of ships, ordnance and other supplies for the war effort.

Mr. Holton died on July 16, after a



Paul S. Killian

career of almost half a century in the steel industry. In 1916 Bethlehem steel acquired Pennsylvania Steel Company, for which Mr. Holton was working, and he was made a buyer. Later he became successively Assistant Purchasing Agent, Purchasing Agent, and Vice President in Charge of Purchases. He served as a director of Bethlehem Steel Corporation from 1935.

(Please turn to page 278)

NEW! SUNICUT 812W and 817W

DUAL-PURPOSE CUTTING OILS FOR
AUTOMATIC SCREW MACHINE WORK

THE NEW Sunicut grades have been thoroughly "Job Proved." Superlative results have been obtained on automatics machining all types of steel and brass at all practical speeds and feeds. These oils serve both as lubricant and cutting fluid. Their use eliminates the problem of cutting oil dilution. They are transparent, non-emulsifying oils compounded with Sun's revolutionary, all-petroleum additive, Petrofac. For further information, fill in and mail the coupon.

SUNICUT 812W is recommended for superior performance on high speed, multiple spindle automatics machining low-carbon steels, alloy steels and brass.

SUNICUT 817W is a higher viscosity oil for use on larger automatics machining all types of steel and brass. It is recommended for severe operations where heavier cuts are taken and higher temperatures maintained.

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Please send me your informative booklet describing the excellent results being obtained in automatic screw machine work with Sunicut 812W and 817W.

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John S. Conant has been elected president of Technical Managers, Inc., New York, which provides industrial counsel and management service in the fields of production, inventory and cost controls, purchasing and materials supply methods, market forecasting, analysis, etc.



John S. Conant

Mr. Conant was formerly General Purchasing Agent and later Director of Procurement for Willys-Overland Motors, Inc., Toledo; General Supervisor, Production Planning, American Steel & Wire Co., and Chief Industrial Engineer and Production Manager, John B. Stetson Co. He entered the U. S. Navy in 1943 and among other activities was associated with the Logistics Organization Planning Unit. He left the Navy to become director of procurement on a Navy research project at John Hopkins University in connection with the development of guided missiles and the radio proximity fuse. He received a degree in mechanical engineering from the University of Pennsylvania in 1931.

Richard L. Morley has been appointed Purchasing Agent for the Gardner, Mass., plant of the Florence Stove Company, according to Myron E. Vaughn, Director of Purchases. Mr. Morely, formerly Assistant Purchasing Agent, succeeds Ivan C. Wink, resigned.

C. Harry McGill has been named Manager of Purchases and Stores, reporting to the president, of the New York, New Haven & Hartford Railroad, New Haven, Conn. Those duties had been performed by Charles E. Smith, Vice President of the road, who recently resigned.

Arthur K. Pearson, Director of Procurement, American Meat Institute, Chicago, discussed "Purchasing Procedure and Inventory Control" at the recent Second Management Seminar for Smaller Business conducted by the School of Business, University of Chicago.

Emphasizing that purchasing's foremost responsibility is that of obtaining the ultimate in value for the money his organization has to spend, Mr. Pearson covered the subject from the standpoint of quantity control, quality control, sources of supply and price policies. He emphasized the point of view that ultimate value is obtained by the exercise of proper purchasing controls. Tools to this end he described as being organization, procedure, proper records, budget controls, management reports, and factors

in determining standards of purchasing performance in their various ramifications, with especial emphasis on inventory control.

J. A. L. Thomson has been promoted from buyer to Assistant Purchasing Agent in Continental Oil Company's purchasing division, Ponca City, Okla. The announcement was made by S. V. McCollum, Purchasing Agent.

Mr. Thomson, an employee of the company for more than 20 years, attended Northeastern Oklahoma A. & M. College. He became a clerk in the purchasing division in 1928, and received successive promotions prior to his present appointment.

Emil A. Fandell, formerly Purchasing Agent of the Northern Trust Company, Chicago, Ill., has been elected assistant cashier. He has been transferred to the savings department to assist Albert E. Walkoe, second vice president and manager.

Donald G. Clark, Director of Purchases of the Gulf Oil Corporation, Pittsburgh, Pa., since 1939, has voluntarily retired from active duty because of ill health. He will continue to act in an advisory capacity. The position of Director of Purchases is being discontinued.

Lee C. Bock, who has been General Purchasing Agent since August 1, 1946, will



Lee C. Bock

be in charge of purchases for all Gulf companies. Mr. Bock has been with Gulf for more than 38 years.

H. K. Jones has been named Purchasing Agent of the Alaska Steamship Co., Seattle, Wash. He succeeds Robert Mooney, who recently left the company. Mr. Jones joined the line in 1943 as a clerk in the purchasing department. In 1944 he was made assistant purchasing agent in charge of repair division purchases, which post he held until his present appointment.

J. A. Weaver has been appointed Purchasing Agent of the Wean Engineering Co., Inc., Warren, O. A. P. Huntley has been named Assistant Purchasing Agent and Traffic Manager.

Joseph W. Nicholson, City Purchasing Agent, Milwaukee, Wis., was the guest speaker at a recent meeting of the Civitan Club of that city. His subject was "Constructive Economy in Government".

J. G. VanNest has been named Director of Purchases for the Mack Truck Company, with overall responsibility for all purchasing for all of the company's plants. He will make his headquarters in the company's offices at Allentown, Pa.

Mr. VanNest joined Mack in 1928 as clerk in the purchasing department in its Plainfield, N. J. plant, and became successively buyer of finished materials, assistant to J. W. Rogers, Plainfield Purchasing Agent, and assistant to O. L. Lear, Purchasing Agent at the Allentown plant.

H. J. Shelton has been appointed Assistant Manager and Purchasing Agent of Williamson Hosiery Mills, Inc., Athens, Tenn.

AMONG THE COMPANIES YOU BUY FROM

Los Angeles, Calif.—P. R. Mallory & Co., Inc. A new branch office has been opened at 1338 South Lorena Street, under the direction of J. E. Templeton. It will serve customers in Southern California and Arizona.

Chicago, Ill.—Joseph T. Ryerson & Son, Inc. J. L. McDermott has been appointed manager of the Ryertex Division. He succeeds Kenneth T. MacGill, who is retiring.

Cleveland, O.—Pennsylvania Flexible Metallic Tubing Company. Don W. Williams, formerly manager of the Los Angeles branch of the company, has been transferred here in the same capacity.

New York, N. Y.—E. W. Bliss Company. The eastern parts, sales and service administrative offices of the company at 19 East 47th Street here, will be retained following the transfer of manufacturing operations from Englewood, N. J. to Hastings, Mich. Wegner Machinery Corp., 35-41 Eleventh St., Long Island City, N. Y. has been named authorized service dealer in metropolitan New York, Connecticut and New Jersey.

New York, N. Y.—Hudson Pulp & Paper Corporation. T. H. Mittendorf has been



T. H. Mittendorf

elected vice-president in charge of sales. He was formerly vice-president in charge of the company's Chicago office.

(Please turn to page 282)



YOU CAN BE **SURE.. IF IT'S**
Westinghouse



Another Life-Line First!

The Broadest Exchange Plan!

Since February, 1949, Life-Line motors have offered you the broadest exchange plan in industry. All 1 to 20-hp, single-phase and three-phase a-c motors in frame 203 to 326 are included. No other manufacturer of motors—large or small—provides exchange service that compares in scope to this new Life-Line Motor Exchange Service.

120 Westinghouse exchange points assure you rush motor replacement service anywhere in the United States. Replacement motors, covered by this plan, are in stock, ready to be speeded to you at any time.

And what's more, if a motor fails during warranty period, it may be exchanged *free* for a motor of identical rating. The *exchange price*, beyond warranty, is not dependent on the time in service . . . one year, five years or ten years.

This service is one more advantage you get with Life-Line motors. Add this to all-steel construction . . . pre-lubricated bearings . . . an indicated savings of \$750 per year per 100 motors . . . and you'll see why Life-Line has gained leading acceptance in the motor industry.

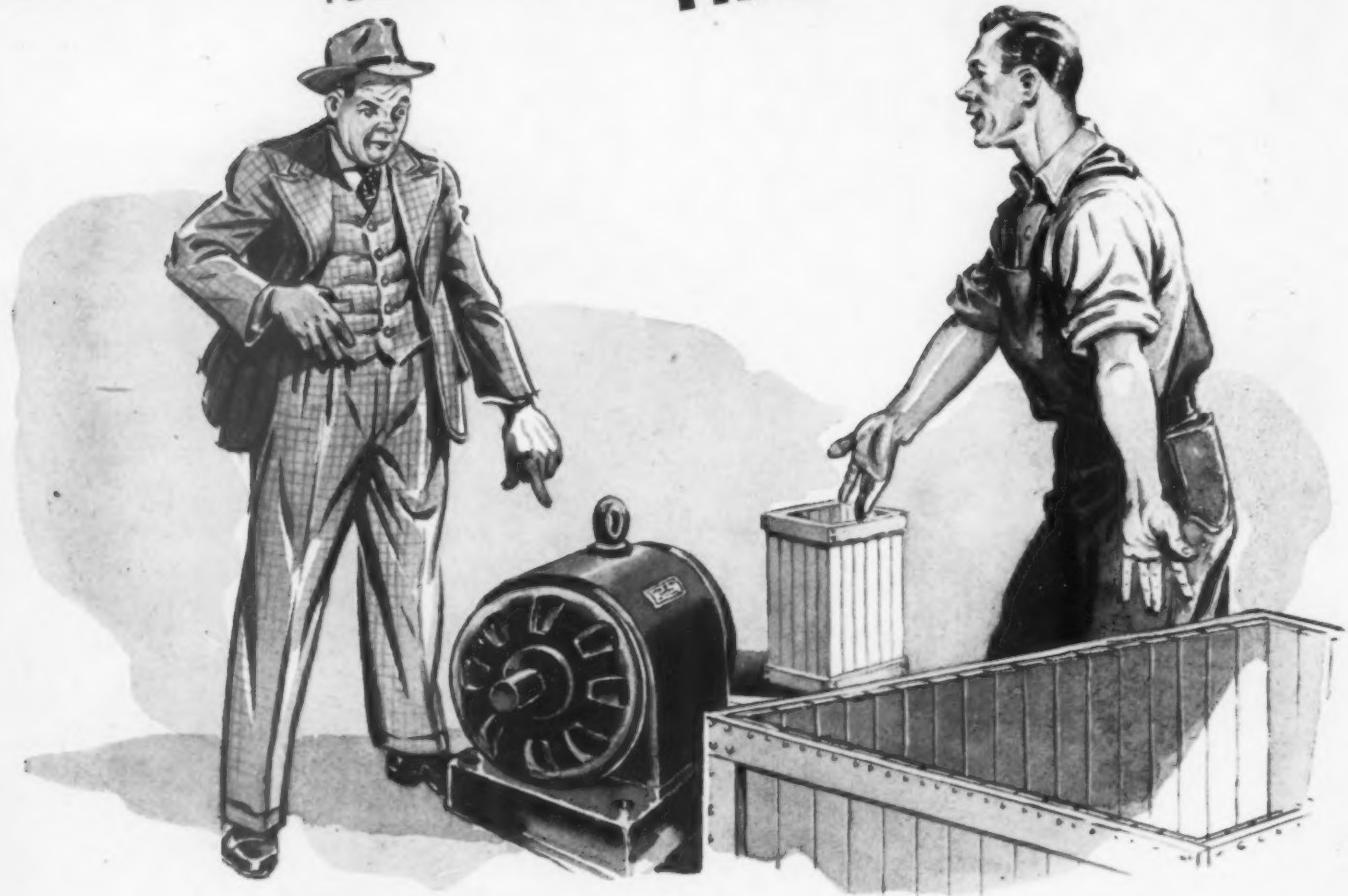
Complete details on the Life-Line Exchange Service—lists of exchange points and motor ratings covered—are given in the new booklet SM-5243. Get your copy today from your nearby Westinghouse representative or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

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Westinghouse
Life-Line
Motors



**IT'S WHAT YOU NEED--
NOT WHAT WE HAVE--
THAT'S IMPORTANT**



We don't have to try and sell you what we have, because we have just about everything.

SUPERSTRONG comprises a complete line of wirebound, wooden and corrugated fibre boxes or crates. They are designed and fitted to your product-with no need to try and fit your product to a ready-made box.

The improved design and sturdy materials of all **SUPERSTRONG** shipping containers give you not only increased protection, but increased economy. Let us tell you all the whys and wherefores.



WIREBOUND BOXES and CRATES

WOODEN BOXES and CRATES

CORRUGATED FIBRE BOXES

BEVERAGE CASES

STARCH TRAYS

PALLETS

RATHBORNE, HAIR AND RIDGWAY COMPANY
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

No Other Blade Offers You Higher Performance, Lower Sawing Costs

When a hack saw blade promises to cut sawing cost 20% to 50% and *delivers what it promises*, it's bound to find ready acceptance fast. That's the story of the Millers Falls "Jet-Edge" — the greatest performer in the history of machine blades.

"Jet-Edge" has already proved itself in metalworking plants throughout the country. It's rugged, unbreakable, safer to use. Customers tell us it outperforms the best blades they've ever tried. The super high speed edge

welded to an extra strong back is the reason why "Jet-Edge" stands up, even under toughest cutting conditions.

For a real revelation in economy and performance, let us give you a "Jet-Edge" demonstration on your own work and in your own hack saw machines. We're sure you'll find it's an eye-opener to actually see what this amazing blade can accomplish. Just write, suggesting a date, and we'll be there. No obligation, of course.

GREENFIELD, MASSACHUSETTS

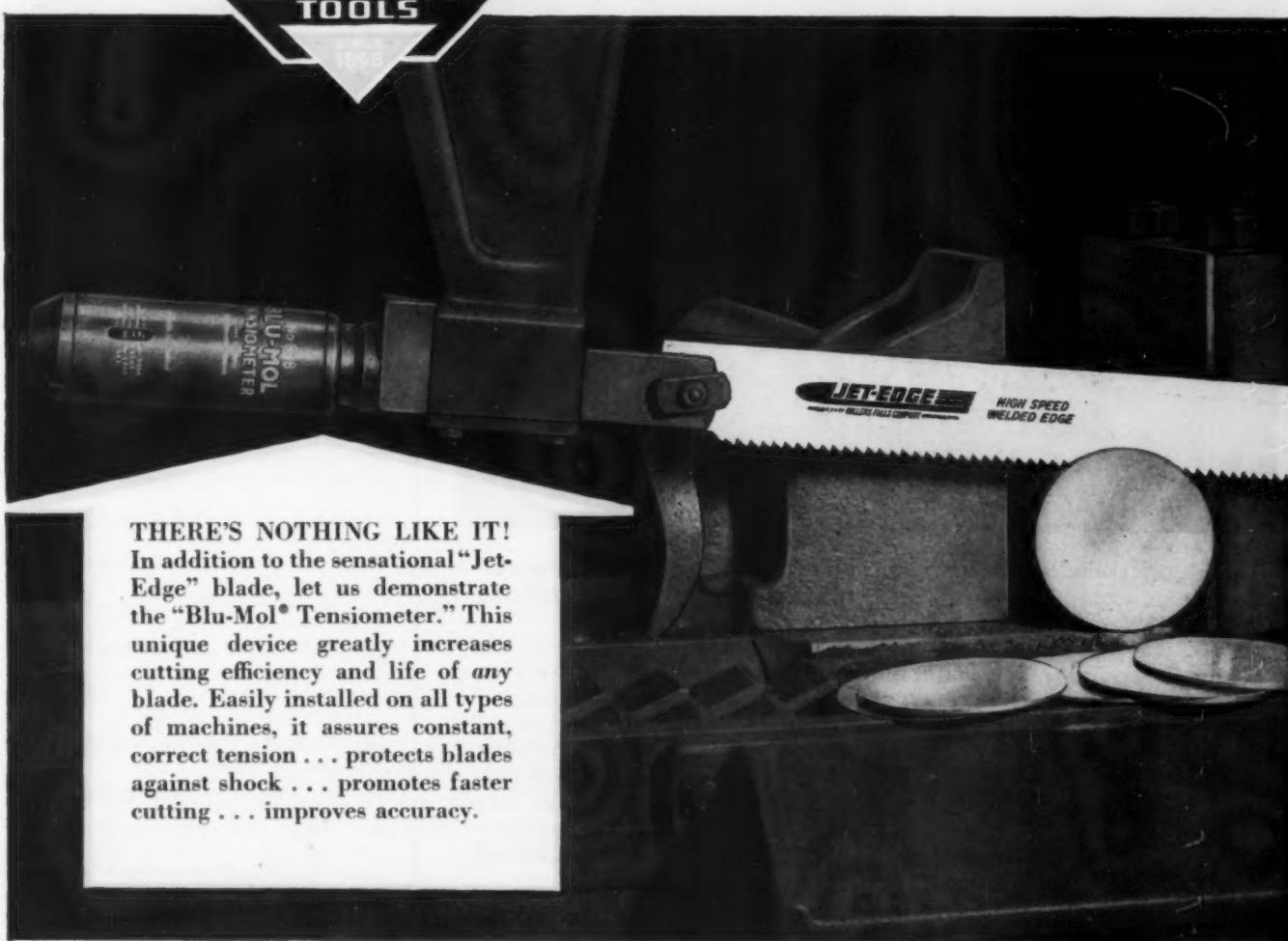
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MILLERS FALLS
TOOLS

BLU-MOL
TENSIMETER

JET-EDGE
HIGH SPEED
WELDED EDGE

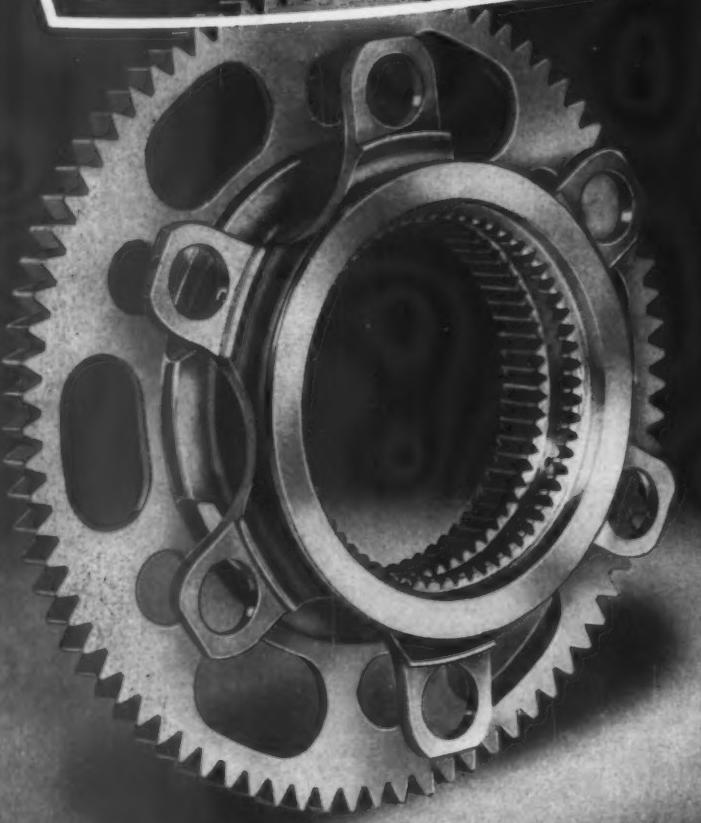
THERE'S NOTHING LIKE IT!
In addition to the sensational "Jet-Edge" blade, let us demonstrate the "Blu-Mol" Tensiometer. This unique device greatly increases cutting efficiency and life of *any* blade. Easily installed on all types of machines, it assures constant, correct tension . . . protects blades against shock . . . promotes faster cutting . . . improves accuracy.



MILLERS FALLS "JET-EDGE" BLADES

AIRCRAFT engine gears

CUSTOM-CUT
BY PERKINS



The highly complex gear shown here, is an example of the exacting production jobs entrusted to us regularly by many of the country's leading manufacturers of aircraft engines. Moreover, our ability in the field of gear engineering extends into practically every industry. Thus a vast amount of all types of equipment in use right now has been built at less cost and operates more efficiently because Perkins' engi-

neers checked the customers' blueprints and specifications prior to manufacture.

Broad experience both in the application and manufacture of all types of gears has equipped our staff to bring to your project a highly specialized knowledge of power transmission problems.

For the manufacture of the highest quality gears in production quantities, consult PERKINS first.

PERKINS MAKES—in all materials, metallic and non-metallic—**Helical Gears, Bevel Gears, Ratchets, Worm Gears, Spiral Gears, Spur Gears with shaved or ground teeth, Ground Thread Worms**

PERKINS MACHINE & GEAR Co., West Springfield, Mass.

Columbus, O.—General Electric Company. Edward J. Roddy, Jr. has been named a district representative for the company's Construction Materials Department, covering Zanesville and Columbus.

Cleveland, O.—The Reliance Electric & Engineering Company. William H. Compton has been made supervisor of standard motor sales.

Milwaukee, Wis.—Globe Steel Tubes Co. F. K. Krell, formerly Chicago district



F. K. Krell

sales representative, has been promoted to the position of manager of sales, welding fittings. John F. Scott, formerly sales representative for the New York district, has been made manager of sales, stainless



J. F. Scott

and alloy tubing. John Koss has been named Chicago representative, and J. J. Lukens New York representative.

New York, N. Y.—Beaumont Birch Company. R. K. Hampton has been appointed resident manager of the company's new offices at 50 Church Street.

San Francisco, Calif.—Worthington Pump and Machinery Corporation. John P. McArthur has been appointed manager, West Coast sales. He will supervise the activities of the Los Angeles, San Francisco, Seattle and Salt Lake City district offices.

St. Louis, Mo.—Graybar Electric Company, Inc. C. A. Rettenmayer has been appointed operating manager for the St. Louis district, which includes branch offices and warehouses at Memphis, Tenn. and Little Rock, Ark.

Milwaukee, Wis.—Harnischfeger Corporation. A. J. Rinnander has become a member of the company and will supervise field activities, Zip-Lift Hoist distributors and sales on a national basis.

(Please turn to page 284)

ALOYCO VALVES

STAINLESS STEEL

prove they can "take it" in Niagara Filters



Niagara Pilot Filter Unit with Aloyco Gate Valves of 18-8SMo stainless steel.

"It is a rare occasion when we have to replace one of the Aloyco Stainless Steel Valves," says the Niagara Filter Corporation.

Yet they say: "The use of Aloyco Valves on these all-stainless steel pilot filter stations puts them to quite a severe test, since these units are rented to all types of companies in the chemical, food, fermentation and process industries, and they must withstand the corrosive action and varying operating conditions of all types of food and chemical liquors. We ourselves often do not know what these units are being used for, but judging from the reconditioning required occasionally, they get some pretty rough usage . . ."

No company—not even yours—can afford the expensive luxury of frequent valve replacements these days. You can save money all along the line by specifying Aloyco Stainless Steel Valves for your corrosive-fluid pipelines.



Aloyco Flanged Gate Valve, No. 111, 150 lb., $\frac{1}{2}$ " to 12" inclusive. Available in 18-8S, 18-8SMo, Aloyco 20 and other corrosion-resistant alloys.

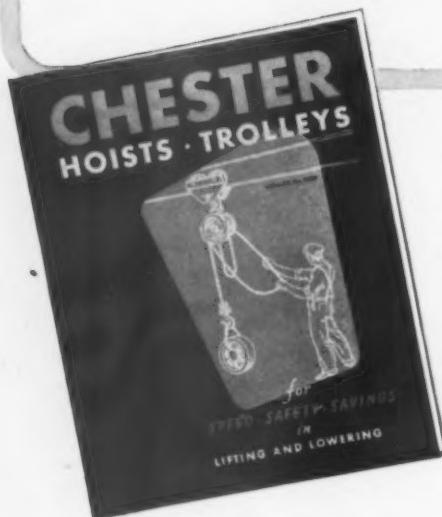
GATE, GLOBE, Y,
CHECK, TANK, SAMPLING
AND V-PORT VALVES
SCREWED AND FLANGED
FITTINGS

SALES OFFICES: ATLANTA,
CHICAGO; HOUSTON; LOS ANGELES;
NEW YORK CITY; PITTSBURGH;
WILMINGTON, DEL.

ALLOY STEEL PRODUCTS CO., Inc.

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Here's Help in
LIFTING • LOWERING
PLACING
of Heavy Materials



- EASIER
- FASTER
- SAFER
- ... at
- LOWER COST

Send for Helpful New Catalog

Chester Hoists and Trolleys, in their basic forms and a number of special adaptations, are being successfully used in every type of industry. Time and again, they have proved themselves to be a self-liquidating investment in better materials handling—by saving valuable man-hours, eliminating damaged materials and production delays. This new catalog tells you why—and how. Send for it today!



CHESTER SPUR GEARED CHAIN HOISTS. Sizes from $\frac{1}{4}$ ton to 25 tons. Timken bearings insure smooth operation, long life. Retaining break holds load at any position.



CHESTER DIFFERENTIAL HOISTS. Designed for use where occasional lifting is required at minimum expense. Made in $\frac{1}{4}$, $\frac{1}{2}$, 1 and $1\frac{1}{2}$ ton sizes.



CHESTER TROLLEYS. Available in either plain or geared types, with either Timken or plain bearings.

THE NATIONAL SCREW & MFG. CO.
Chester Hoist Division • Lisbon, Ohio

Burbank, Calif.—Adel Precision Products Corp. Fred T. Miller has been elected vice-president in charge of engineering and sales, and R. A. Stumm, Jr., vice-president in charge of manufacturing. Mr. Miller was previously general sales manager. Mr. Stumm joined Adel in 1946 as purchasing agent, and from June, 1948 has served as assistant to the president.

Toledo, O.—Owens-Illinois Glass Company. William H. Hankins has joined the company as general sales manager of its Kaylo Division, handling a new group of building material and insulating products recently developed. He was formerly special representative of the Kuhlman Builders Supply & Brick Co.

Los Angeles, Calif.—The Thomas Steel Company. California Cold Rolled Steel Corporation has been appointed western distributors and agents. John Gregory will continue to represent Thomas Steel from his San Mateo headquarters.

Chicago, Ill.—American Steel and Wire Company. Clarence T. Gilchrist, assistant general manager of sales for the Chicago district during the last four years, has



Clarence T. Gilchrist

been made western area sales manager. Roswell F. Curtis has been appointed eastern area sales manager, with headquarters in New York, and Howard B. Maguire, has been named central area sales manager, with headquarters in Cleveland.

Washington, D. C.—Brush Development Company. A branch office of the company, manufacturers of electronic and electri-mechanical products, has been opened here under the direction of Karl F. Kellerman.

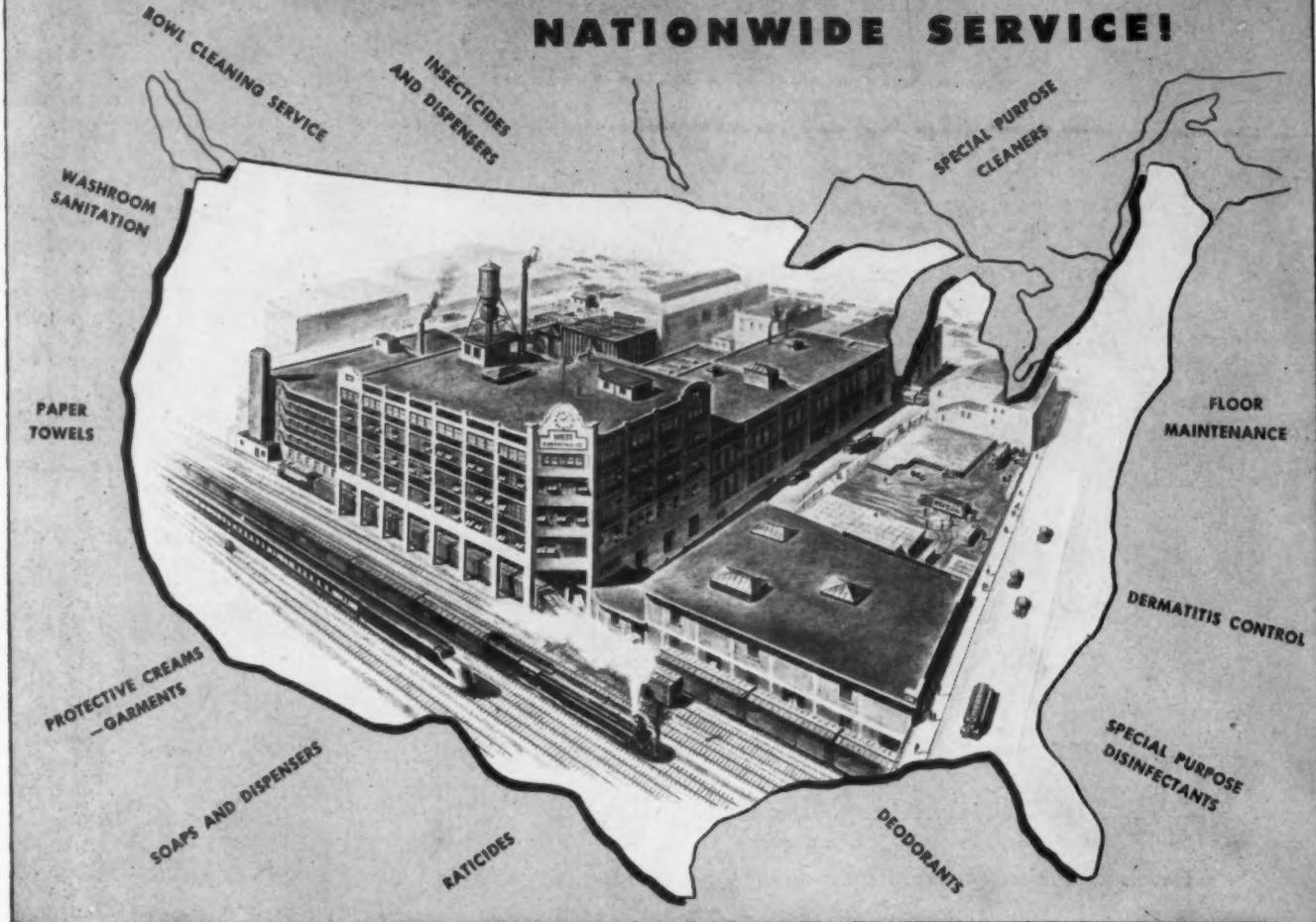
Gary, Ind.—The Reliance Electric & Engineering Company. Robert O. Magnetti has been appointed branch manager here.

St. Paul, Minn.—Scully-Jones & Company. A. A. Gustafson, 2580 University Blvd., has been appointed factory representative in Minnesota and the Wisconsin counties of Eau Claire and Chippewa.

New York, N. Y.—McBee Company. A. F. Niendorff has been appointed assistant general sales manager and will operate from the company's sales headquarters here.

(Please turn to page 286)

NATIONWIDE EXPERIENCE!
NATIONWIDE FACILITIES!
NATIONWIDE SERVICE!



Speaking of MODERN SANITATION
...here's one way to lower your costs

Maintenance costs are determined by labor expense and product cost. Hourly wage costs are fixed, but if you purchase products that do the job *quicker, easier and better*, overall costs will be reduced. West's complete line of sanitation products are formulated to provide maximum results with a minimum of expense.

For the past 63 years, the West Disinfecting Company has helped plan effective and economical health and sanitation programs for thousands of industrial plants and institutions of every description. West's constant aim is to lower your sanitation and maintenance overhead by providing a complete line of *scientifically formulated* products. The ability of these West products to do a given job with greatest ease, speed, and thoroughness has been

proven, over and over again, in the most varied and exacting field tests. West products are being continuously improved under the guidance of West's skilled staff of Chemists, Sanitation Engineers, Dermatologists and Entomologists. No matter how specialized or technical *your own* problem, West possesses the "know-how" to solve it.

Why not consult one of West's nearly 500 specially trained representatives? He will be glad to discuss with you—at no obligation—questions concerning industrial and institutional health, sanitation and maintenance. West offers NATIONWIDE SERVICE with Branches in all Principal Cities throughout the United States and Canada. Fill in the attached coupon and a nearby representative will contact you.

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WEST DISINFECTING COMPANY
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Gentlemen:
 Please have your representative call
 Please send literature
 I am interested in _____

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15

WEST DISINFECTING
Company

42-16 West Street, Long Island City 1, N. Y.

*Source for
Special Parts*

Your own design
formed and threaded parts
produced **Extra Fast** with
Extra Economy



Cold forged by our application of the Kaufman Process

Here's a slick way to hold costs down for a competitive market. Have your unusual parts and fasteners made by fast economical forging—the Kaufman Process—at Cleveland. In production quantities, this method provides extra savings in both cost and delivery time. It gives you *stronger* parts; this process toughens surface sections while preserving the interior ductility of the steel. Your steel specifications and heat treatment requirements are fully met. It pays you to send blueprints and specifications for our estimate.

THE CLEVELAND CAP SCREW COMPANY
2917 EAST 79TH STREET • CLEVELAND 4, OHIO



CLEVELAND
Top Quality
FASTENERS

ORIGINATORS OF THE
KAUFMAN DOUBLE EXTRUSION PROCESS
Specialists for more than 30 years in
CAP SCREWS, SET SCREWS, MILLED STUDS
Ask your jobber for Cleveland Fasteners

Peoria, Ill.—Hyster Company, J. W. Morgan has been advanced to the post of assistant sales manager of the eastern sales division, with headquarters at the Hyster plant here.

Livermore, Calif.—Coast Manufacturing & Supply Company. H. Bailey Little, formerly manager of the San Francisco office of Owens-Corning Fiberglas has been named sales manager of Coast Manufacturing's textile division.

Los Angeles Calif.—Fansteel Metallurgical Corporation. Henger-Seltzer Company has been appointed West Coast sales distributor for a number of products made by Fansteel and its wholly-owned subsidiary, Weiger Weed & Company.

Salt Lake City, Utah—Chain Belt Company. Douglas Jones has been named manager of the Salt Lake City district office at 1551 Redondo Avenue.

Roscoe, Pa.—Templeton, Kenly & Co. Mark C. Simpson has been appointed



Mark C. Simpson

Pennsylvania division sales manager for the company, manufacturers of Simplex jacks.

Buffalo, N. Y.—Wagner Electric Corporation. R. E. Bryant has been appointed manager of the company's automotive and electrical branch here.

Syracuse, N. Y.—Warner & Swasey Company. Field engineer Howard Davies has been assigned to the company's district sales office here.

Boston, Mass.—Monsanto Chemical Division. Thornton C. Jesdale and Chester L. Jones have been appointed assistant general managers of sales for the company's Merrimac Division.

Sharon, Pa.—Westinghouse Electric Corporation. C. H. Bartlett has been appointed sales manager for the company's transformer division.

New York, N. Y.—Anemostat Corporation of America. C. Milton Wilson has been named sales manager.

Brooklyn, N. Y.—Atlantic Brass and Copper Company, Inc. Executive offices of the firm have been moved to 328 St. Marks Avenue.

Minneapolis, Minn.—Wagner Electric Corporation. C. J. McElman has been appointed manager of the company's automotive branch here.

Pittsburgh, Pa.—United States Rubber Company. Matthew J. Delehaunt has been named district sales manager for the local branch of the mechanical goods division.

Los Angeles, Calif.—Turco Products, Inc. F. E. Warnes, formerly sales supervisor for the Pacific Northwest, has been appointed director of sales promotion.

St. Louis, Mo.—The Ridge Tool Company. L. C. Richardson has been appointed sales representative for the com-



L. C. Richardson

pany's Inter-mountain territory. States under Mr. Richardson's supervision are Missouri, Kansas, Colorado, Arkansas, and Wyoming.

Boston, Mass.—The Backcock & Wilcox Tube Company. A new Boston district sales office has been opened at 250 Boylston Street, to serve the New England area. J. W. Bramley has been appointed manager.

Minneapolis, Minn.—Marcus Transformer Company, Inc. Edward K. Meyer Company, 714 Sixteenth Avenue, S. E., has been appointed representative.

Chicago, Ill.—LaSalle Steel Company. William Campbell has been appointed sales representative, covering part of Chicago and nearby territory.

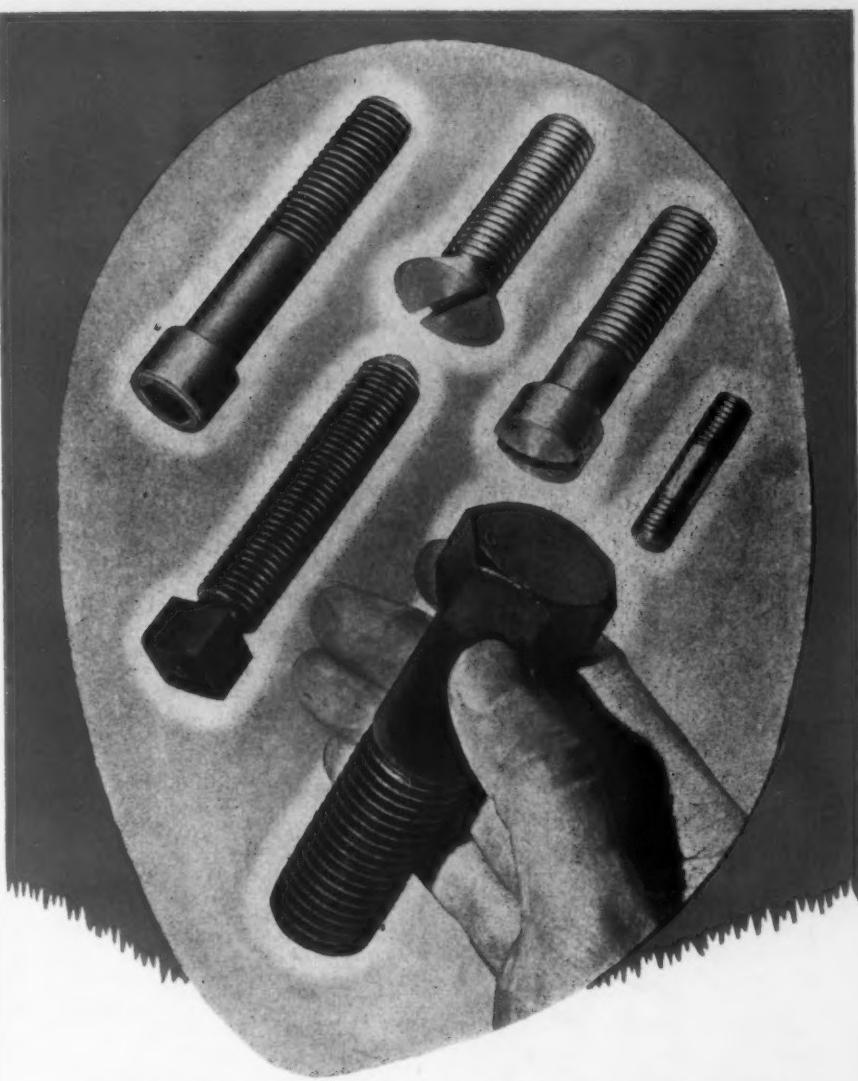
Youngstown, O.—Republic Rubber Division, Lee Rubber and Tire Corporation. James M. Hughes has been appointed sales promotion manager.

Billings, Mont.—Hewitt-Robins Incorporated. Hines Bearings and Industrial Supply Co. has been appointed distributor of Hewitt industrial rubber products.

Cleveland, O.—Avery Adhesive Label Corporation. Martin Bender has been appointed manager of the company's office here.

Philadelphia, Pa.—George K. Garrett Company. Francis J. Borowsky has been named junior vice-president in charge of sales.

East Chicago, Ind.—Edward Valves, Inc. Herbert J. Rowe has been named sales engineer for the Great Lakes region.



CLEVELAND SPECIALIZATION in Cap Screws, Set Screws and Milled Studs

assures you extra accuracy, extra rigid inspection, extra fast delivery

Cleveland concentrates on making a few items well—a policy adhered to for more than 30 years. Because of this specialization, we carry what we believe is the widest range of sizes in the industry, including diameters to 1½ inches and unusual lengths. Fast production by modern facilities helps us to give you extra fast delivery of *Top Quality Products*. It pays you to specify and buy Cleveland Fasteners. The Cleveland Cap Screw Company, 2917 East 79th Street, Cleveland 4, Ohio; Warehouses, Chicago and Philadelphia and New York.

CLEVELAND
Top Quality
FASTENERS

ORIGINATORS OF THE
KAUFMAN **DOUBLE EXTRUSION PROCESS**

Specialists for more than 30 years in
CAP SCREWS, SET SCREWS, MILLED STUDS
Ask your jobber for Cleveland Fasteners



HOW TO SAVE MONEY ON Quality Name Plates

Etched or lithographed, ECOA quality name plates are themselves economical because they are permanent marks of distinction which add sales appeal to your product. They look better—longer. Ask us to quote on your designs—or if you wish, our Art Department is available to assist you in the design of your name plates. You can save money, too, by using one of nearly 5000 shapes and sizes for which we have dies in stock.

FREE BOOK If you or your engineering department can use this book, which shows the shapes and sizes of nearly 5000 dies we have on hand, write for it on your letterhead. Name plates made in these shapes and sizes save the cost of special tools.



ETCHING COMPANY OF AMERICA

1520 MONTANA ST., CHICAGO 14, ILL., DEPT. C-9

Metal Name Plates, etched or lithographed • Plastic Name Plates, Dials and Panels, lithographed or screened • Etched Metal Scales, Clock Dials, Instrument Panels, Art Novelties, Advertising Specialties • Etched Metal Panels for elevators and architectural uses.

SUBSIDIARY OF DODGE MFG. CORPORATION, MISHAWAKA, INDIANA



INDUSTRIAL DEVELOPMENTS

Knapp Mills, New York, N. Y., manufacturers of chemical and process equipment, lead-lined steel pipe, fittings, valves, etc. has purchased a plant in Wilmington, Del., formerly owned by the Bethlehem Shipbuilding Company. The move is intended to aid in the expansion of the company's activities, including the production of commodities not previously manufactured.

Crucible Steel Company's primary steel melting operations have been centered in Midland Works, Midland, Pa., in line with the company's plant improvement program. Electric melting of steels continues in the Sanderson-Halcomb Works, Syracuse, N. Y.

The Baker Industrial Truck Division of The Baker-Rauland Company, Cleveland, O., has announced the appointment of John A. Matousek as manager of manufacturing.



John A. Matousek

He will have charge of all manufacturing, purchasing and engineering functions. He was formerly assistant to the vice president in charge of manufacturing of the Cleveland Graphite Bronze Company.

The Auto-Lite Battery Corporation, Toledo, O., has announced the following appointments and transfers of sales personnel:

M. J. Barber, formerly representative of the Chicago North district has been transferred to Detroit, Mich. Wesley B. Crow, Jr. has been named to take charge of the Oklahoma City, Okla., sales district. Paul H. Davison has taken over the Omaha, Nebr. district. Gilbert F. Kirkpatrick will be in charge of the Peoria, Ill., district. Northeastern Texas and parts of Arkansas and Louisiana will be covered by Tony Freeman, who has been named to head the Dallas, Tex. sales district.

The Lincoln Electric Company, Cleveland, O., has announced the following changes and additions to its sales engineering staff: E. E. Goehringer has assumed sales and engineering responsibility in the Indianapolis, Ind. area as district manager; Omer Blodgett has been transferred to the Chicago office from Grand Rapids, Mich.; R. L. Hall and Robert Hirsch have been assigned to the Pittsburgh, Pa. office as district engineers.

(Please turn to page 290)



Call your nearest CHASE WAREHOUSE for anything in Brass, Copper or Bronze! . . .

Why take the long way around when you're looking for copper-alloy mill products?

Take the short road!

Any one of 23 Chase warehouses from coast to coast is at your service, ready to supply you with brass and copper sheet, rod, wire and tube. (Plus

a great variety of miscellaneous items, from copper hammers to nails.)

Your local Chase warehouse will fill regular orders immediately...and can also arrange for prompt delivery of your big orders from the mills.

Act now! Chase service is as close as your phone.

Chase

WATERBURY 20 CONNECTICUT



*the Nation's Headquarters for
BRASS & COPPER*

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

THIS IS THE CHASE NETWORK . . . handiest way to buy brass

ALBANY ATLANTA BALTIMORE BOSTON CHICAGO CINCINNATI CLEVELAND DALLAS DETROIT HOUSTON INDIANAPOLIS KANSAS CITY, MO. LOS ANGELES MILWAUKEE MINNEAPOLIS NEWARK NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE ROCHESTER ST. LOUIS SAN FRANCISCO SEATTLE WATERBURY (Sales Office Only)

As work-weeks shrink



You need the

DETEx GUARDSMAN

The GUARDSMAN watches your Watchman on long week-ends—when he may be tempted to sleep or shirk because nobody is around to catch him at it.

This newest and most modern tape-recording DETEx Watchclock saves you (or one of your executives) the time and trouble of returning to the plant to change the clock dial. The GUARDSMAN operates for 96 hours, if necessary, without cutting the tape.

Don't be half safe. Arrange for mechanical supervision of your Watchman. The cost of a DETEx system is quickly liquidated by reductions in your insurance premiums. Send for FREE folder today.

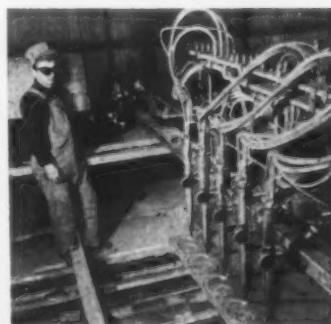


DETEx
WATCHMEN'S CLOCKS
DETEx WATCHCLOCK CORPORATION
Dept. P9
76 VARICK STREET, NEW YORK 13, N.Y.
GUARDSMAN Sales and Service in All Principal Cities

General Electric Company's Construction Materials Department has formed a new Northwest sales district, serving the wholesale trading areas of Seattle and Spokane, Wash., Portland, Ore., Boise, Idaho, Salt Lake City, Utah, and Butte and Billings Mont. William W. Bryan has been named district manager.

Aluminum Division of Harvey Machine Company, Inc., Torrance, Calif., has established additional distributorships under special factory trained sales engineers. Pacific and Northwest will be covered by Donald Gjesdahl; Chicago extended area by Calven S. McKee; Central and Southeast section by Art G. Bower, with headquarters in Dallas, Tex.; Middle Atlantic States by Charles A. Euler, Jr.

Joseph T. Ryerson & Son, Inc., warehouse steel company, has completed installation of 11 Airco No. 41 Travograph oxyacetylene cutting machines, each equipped with an electronic device. These machines have



Flame-cutting at Ryerson warehouse

been installed in Ryerson plants from New York to San Francisco. The electronic tracing device, an Air Reduction development, permits cuts in steel that are unobtainable by any other method.

The Reliance Electric & Engineering Company, Cleveland, O., has added the following field sales personnel: Emory G. Orahod, Jr., to the Atlanta, Ga. district office; Robert B. Reed, to the Birmingham, Ala. district office; and John Drolinger, Jr., to the Detroit, Mich. district office.

Jan-Air, Inc., Richmond, Ill., has purchased the fan wheel division from the Janette Manufacturing Company, Chicago, Ill.

The Great Northern Seating Company, Chicago, Ill. has been formed by Rudolph J. Silverman.

The Sturgis Products Co., Sturgis, Mich., producer of Roto-Finish materials, equipment and processes for mechanical finishing, has changed its corporate name to the Roto-Finish Company, and moved all sales and manufacturing to its new plant in Kalamazoo, Mich.

Woodall Industries, Inc., fabricators of fiberboard materials, recently broke ground for a new million dollar plant in Skokie, Ill., Chicago suburb. A duplicate plant is soon to be built at Mineola, N. Y. (Please turn to page 292)



"ANYTHING—ANYWHERE"
for a single charge!

RAILWAY EXPRESS provides dependable, uniform shipping facilities through 23,000 offices from coast to coast. Here's fast, complete service, by rail or air, designed to meet your every shipping need—for a single, all-inclusive charge!

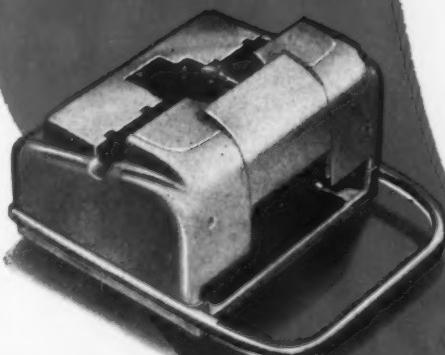
For really economical, "anything—anywhere" shipping, specify RAILWAY EXPRESS.



NATION-WIDE RAIL-AIR SERVICE

TAKE THE DEAD WEIGHT OUT OF YOUR PRODUCT WITH

"DOLER-MAG"[™] MAGNESIUM



YOUR PRODUCT
could be a design success story like these!

SCINTILLA DISTRIBUTOR HOUSING FOR AIRCRAFT ENGINES

Lightness plus our ability to cast the many holes determined the use of "DOLER-MAG" die casting in this operation.

8½" Diameter x 3⅛" High. Weighs—1.85 lbs.

UNDERWOOD ELECTRIC TYPEWRITER (Assembled)

The number of magnesium die castings used in this unit reduce weight and provide necessary stiffness and rigidity. Damping capacity effectively reduces vibration and operational noise.

Six parts—Total Weight 4.573 lbs.
Equivalent steel parts weigh 4 times as much.

*Reg. U.S. Pat. Off.

"DOLER-MAG" magnesium die castings
give you these advantages:

Lightest weight alloy die cast • Supply inexhaustible
Non-strategic • Machining at higher speeds • Machining
with greater economy • Excellent dimensional stability
Excellent noise damping quality • Excellent paint or
coat finish • Non-sparking • Non-toxic • Non-magnetic.

SEND FOR MORE INFORMATION TODAY.

Doebler-Jarvis Corporation
386 Fourth Avenue,
New York 16, N. Y.

Dept. S-2

Please send me your special pamphlet on
"Doler-Mag," plus other technical pamphlets
on various die casting applications.

Name.....

Company.....

Street.....

City..... State.....

DOEHLER-JARVIS CORPORATION

The World's Largest Producer and Finisher of Die Castings



Executive Office
386 FOURTH AVENUE
NEW YORK 16, N. Y.



SAVE

- MATERIALS
- MAN-HOURS
- MONEY

with the . . .

RIGHT RIVETS

Select exactly the right semi-tubular, split rivet, or cold-headed fastener from Milford's complete line. You'll find it pays in every way!

RIGHT MACHINE

Then use the right rivet setting machine for your application. One of Milford's 15 basic machines is sure to solve your particular problem . . . and slash your production costs!

Write to Dept. B

MILFORD
RIVET & MACHINE
COMPANY
MILFORD, CONN.
ELYRIA, OHIO
HATBORO, PENN.

The L. S. Starrett Company, Athol, Mass., has purchased the Burrill Saw and Tool Works, Ilion, N. Y., manufacturers of Paramount band knives and band saws. The products are now being manufactured exclusively by The L. S. Starrett Company in their Athol plant and are being marketed under the Starrett name.

The Gordon Steel Company, with offices at 105 West Adams St., Chicago, Ill., has been established by Bernhard Gordon, for more than 20 years associated with Caine Steel Co., Chicago.

Pennsylvania Salt Manufacturing Company recently opened a new \$2,000,000 chemical plant in Calvert City, Ky. for the production of hydrofluoric and other acids.

Columbia Chemical Division of Pittsburgh Plate Glass Company has placed in operation a chlorinated benzene producing plant at Natrium, W. Va. The new plant, cost of which is estimated at \$1,000,000, will produce monochlorbenzene, muriatic acid, paradichlorbenzene and orthodichlorbenzene as co-products in a continuous chemical process.

SKF Industries, Inc., has announced expansion of its plant at Shippensburg, Pa., to provide additional facilities for the production of anti-friction bearing retainers.

The Standard Stoker Company, Inc., Erie, Pa., has acquired complete control of the Chicago Automatic Stoker. This stoker is now being built at Standard's Erie plant, and will continue to be known under its original name.

General Electric Company has completed a \$3,205,000 program of modernization of its facilities at Lynn, Mass., for the production of outdoor lighting equipment.

Sundstrand Machine Tool Co., Rockford, Ill., has purchased the Rockford Magnetic Products Co., of the same city. The new subsidiary will be operated under the name of Sundstrand Magnetic Products Co. and will continue the manufacture of its line of magnetic holding devices.

General Electric Company's Construction Materials Department has opened a new Pacific District warehouse at 3000 East 46th Street, Los Angeles, Calif.

National Tube Company, Pittsburgh, Pa., has announced plans for the construction of a new electric welded steel pipe mill at its National Works, McKeesport, Pa. The new facilities will provide for an annual capacity of 100,000 net tons of 26" and larger diameter electric welded and expanded steel pipe.

Benjamin Foster Company, Philadelphia, Pa., has established a new division to handle Fiberglas industrial insulations for both hot and cold applications.

(Please turn to page 294)



GITS WICK OILERS CUT YOUR “DOWN-TIME”

. . . by providing proper lubrication with a permanent, low-cost installation.

 Wick's capillary action filters lubricant and provides measured, controlled oil drops—without damaging, extreme pressures.



Generous capacities supply oil when you want it and eliminate frequent refills.



Unbreakable plastic reservoir.



Transparent reservoir—signals need for refills.

By protecting your bearings, Gits Wick Oilers produce uninterrupted machine performance.

STANDARD SIZES
AVAILABLE FROM STOCK

WRITE TODAY

for New Descriptive Booklet

GITS BROS. MFG. CO.
1865 S. Kilbourn Ave.
Chicago 23, Ill.



HIRD O F A S E R I E S

Know Your Plastics

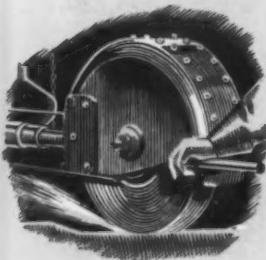
IT MAY MEAN BETTER AND FASTER PRODUCTION...AT LOWER COST!

When you investigate plastics for your new or redesigned product, think first of BAKELITE Plastics and Resins. The BAKELITE family of plastics includes those in greatest demand. This gives you a wide selection, all from one

supplier. The chances are that you will find the one plastic or resin that is best suited to your production facilities, and also the plastic that gives best qualities to your finished products at the lowest possible cost.

This message deals with "BAKELITE" BONDING RESINS

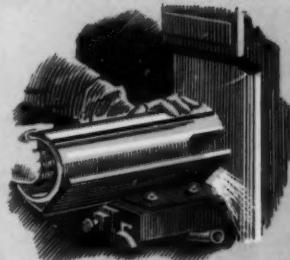
1. BONDING RESINS FOR ABRASIVE WHEELS



BAKELITE Phenolic Resins bond the abrasive particles of today's high-speed, heavy-duty grinding and snagging wheels operating at 9,000 surface feet per minute and cut-off wheels that operate at up to 16,000. These wheels are cool-running, non-gumming. The resin holds the particles until they're worn out, then releases them, exposing new particles to surface.

Typical uses: Grinding steel billets and castings; cutting off rod- and bar-stock; finishing alloy steels.

4. RESINS FOR ABRASIVE BELTS AND DISKS



"Coated" abrasive belts, disks, and sandpaper—with abrasive anchored to backing by BAKELITE Phenolic Resins—last up to five to six times longer in high-speed precision grinding. High resistance to heat and moisture permits either dry-grinding of metals, or wet-grinding of low-fusion-point materials.

Typical uses: Many grinding jobs once done only by milling machines, profilers, shapers, even planers.

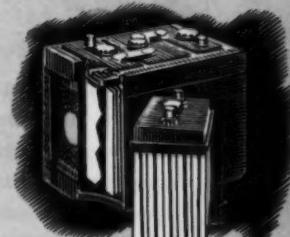
5. BONDING RESINS FOR THERMAL INSULATION



BAKELITE Phenolic Resins are widely used to bond glass wool, mineral wool, and vegetable fibers for thermal-insulation batts that possess high mechanical strength and stability even under conditions of excessive humidity and elevated temperatures.

Typical uses: Insulation for homes, refrigerators, and automotive equipment.

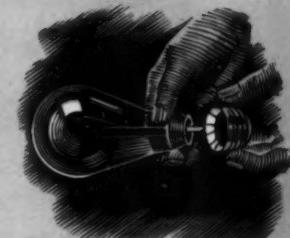
6. BONDING RESINS FOR FIBROUS MATERIALS



BAKELITE Polystyrene Resin emulsions form highly efficient bonds for many organic and inorganic fibers. They provide highly acid-resistant bonds for spun-glass mats that separate storage battery plates. They're excellent binders for carpet backing, preventing raveling, improving "hand," maintaining dimensions, and withstanding shampoos.

Typical uses: Storage battery mats, rug and carpet backing, paper and cloth.

7. TECHNICAL GENERAL PURPOSE CEMENTS



These BAKELITE Phenolic Cements are supplied in both baking and air-drying types, and in powder, paste, and liquid forms. They offer good resistance to heat and many chemicals, depending upon formulation and processing.

Typical uses: Joining dissimilar materials such as plastics, rubber, cork, wood, glass, ceramics, paper, asbestos board, and metals.

Bakelite
TRADE-MARK
BONDING RESINS

BAKELITE
CORPORATION

These are seven major industrial uses for BAKELITE Bonding Resins, which contribute so much to the economy of nearly every industry. The resins are produced in such variety and with so many useful properties that their new applications are endless. Bakelite Corporation has worked for nearly 40 years to increase their usefulness—gaining experience and knowledge that we would be glad to bring to bear on your problems. Your inquiries will be treated in confidence. For detailed technical data on BAKELITE Bonding Resins—or if you wish a Bakelite representative to call—write Department O-25.

AMERICAN SASH CHAIN

...the

"many-purpose"

Chain



This AMERICAN chain is known—and widely used—as Sash Chain. But in the many sizes now available, it has hundreds of uses.

Your AMERICAN CHAIN distributor offers Sash Chain made of Solid Bronze and of Carbon Steel in a selection of finishes. It can also be made of Stainless Steel, of Monel Metal and of Brass. Tensile strengths range from 350 lbs. to 900 lbs. High quality is assured by uniformity of material and precision in fabrication.

Your American Chain distributor is a responsible source for weldless chain made of wire or stampings, electric welded or forge welded chain, a complete line of fittings, attachments and assemblies, cotter pins, hooks, repair links.

BUY AMERICAN—THE COMPLETE CHAIN LINE

ACCO

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.



AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

Phosphor Bronze Corporation, Seymour, Conn., has announced the appointment of John C. Blake as general manager. The company recently moved to Seymour from Philadelphia, Pa. Mr. Blake has had nearly 35 continuous years in the brass mill industry, beginning as a clerk in the wire mill of the Seymour Manufacturing Company in 1915. In 1925 he joined the Riverside Metal Co., Riverside, N. J., and in December, 1943 was appointed general sales manager of that company, a position which he held until his resignation in June, 1949. His major activities in his new connection will be in the sales field.

The Hartford Special Machinery Company, Hartford, Conn., has purchased the special drilling machinery line formerly manufactured by the Langelier Manufacturing Company, Cranston, R. I.

The Youngstown Sheet and Tube Company will spend approximately \$4,500,000 on its blooming mill at Campbell, O. to roll wider slabs for heavier coils of sheets for the automobile industry. The present limit of slab width is 43½", and the new range will be up to 56".

Burrell Corporation is the new corporate name of the former Burrell Technical Supply Company, Pittsburgh, Pa.

Scully-Jones & Company, Chicago, Ill., has formed a production parts division with facilities for machining, heat treating, grinding, sub-assembly and inspection.

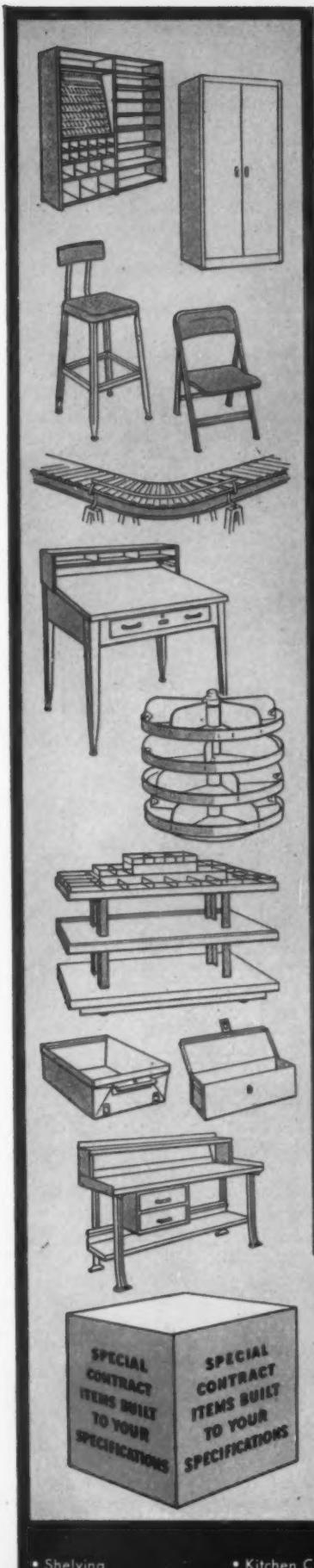
The Dickey-Grabler Company, Cleveland, manufacturers of precision stampings has completed another addition to its factory, bringing the plant area up to 70,000 square feet. The company offers a number of special services, including induction brazing, assembly department, finishing department and engineering service.

Rogers Corporation and Bakelite Corporation have announced the termination of their toll agreement. Under the agreement, Rogers, with plants in Goodyear and Manchester, Conn., had manufactured a group of high strength thermosetting phenolic materials for Bakelite. Simultaneously, Rogers announced the expansion and integration of its materials and services.

Dorman Machine Tool Works, Mt. Vernon, N. Y. and Thriftmaster Products Corp., Lancaster, Pa. have consolidated manufacturing and sales activities. The complete lines of Dorman tapping attachments and Thriftmaster adjustable and fixed center drillheads will be manufactured at Lancaster.

American Structural Products Company, a subsidiary of Owens-Illinois Glass Company, will acquire all of the industrial and electronics manufacturing facilities formerly centered in the Kimble Glass Division of Owens-Illinois Glass Company.

Hamilton-Thomas Corp., Hamilton, O., has announced the acquisition of The Smith & Mills Company, Cincinnati, O., manufacturers of crank shapers.



LYON

No.

1 source of supply

for

STEEL EQUIPMENT

LYON METAL PRODUCTS, INCORPORATED

General Offices: 933 Monroe Avenue, Aurora, Illinois • Branches and Dealers in All Principal Cities



A PARTIAL LIST OF LYON PRODUCTS

- Shelving
- Lockers
- Wood Working Benches
- Economy Locker Racks
- Kitchen Cabinets
- Display Equipment
- Hanging Cabinets
- Welding Benches
- Filing Cabinets
- Cabinet Benches
- Folding Chairs
- Drawing Tables
- Storage Cabinets
- Bench Drawers
- Work Benches
- Drawer Units
- Conveyors
- Shop Boxes
- Bar Racks
- Bin Units
- Tool Stands
- Service Carts
- Hopper Bins
- Parts Cases
- Flat Drawer Files
- Tool Trays
- Tool Boxes
- Desks
- Sorting Files
- Stools
- Revolving Bins

Quality

CASTINGS

in...

MEEHANITE®
ABK METAL
GRAY IRON

(plain or alloy)

● American Brake Shoe research and advanced foundry techniques can benefit you. When you refer your requirements to Brake Shoe, you get sound, clean, metallurgically correct castings, and machined rejects are low. You also receive the advantage of impartial recommendations as to metal types, such as:

Meehanite® — a series of controlled irons in 3 general groups to meet specific requirements; general engineering, heat resistant, corrosion resistant.

ABK Metal — a premium grade alloyed iron with outstanding abrasion resistance.

Engineered Gray Iron — a series of engineering cast irons with controlled properties and good machinability.

At Brake Shoe's large and well-equipped production foundries in Mahwah, N. J., Melrose Park, Ill., and Baltimore, Md., castings of widely used types can be made — light, medium or heavy weight, green or dry sand, or all core assemblies — as well as difficult or special purpose types.

Whatever your present or future needs for cast parts may be, send your specifications to Brake Shoe for expert recommendations.

W. H. WIEWEL BECOMES CRUCIBLE SALES VICE PRESIDENT

Walter H. Wiewel has been appointed vice president in charge of sales of the Crucible Steel Company of America, New York, N. Y. Mr. Wiewel, who retains his present post as president of the Crucible subsidiary, Trent Tube Company of East Troy, Wis., was also elected to the Crucible board of directors. He will head all sales activities of Crucible and Trent and will make his headquarters in Pittsburgh.

Mr. Wiewel became associated with Crucible when the Trent Tube Company was acquired as a wholly-owned subsidiary of Crucible in 1948. Trent is a producer of stainless and alloy steel thin-wall tubing made by a continuous welding process.

From 1935 until 1944 Mr. Wiewel was assistant general sales manager of the Jones & Laughlin Steel Corporation, and during the war years he was chief of the tubing branch, Steel Division of WPB, and also vice chairman of the production directive committee of the division. He joined National Tube in 1944 as



W. H. Wiewel

assistant to the president, and joined the Trent Tube Company in 1947.

He is a member of the American Iron & Steel Institute and the American Petroleum Institute.

With Mr. Wiewel's appointment it was announced that William E. Pennington of New York and John S. Billingsley of Pittsburgh have taken new sales posts. Mr. Pennington, formerly assistant general manager of sales becomes eastern sales manager with headquarters in New York. Mr. Billingsley becomes central sales manager with his headquarters remaining in Pittsburgh where he has been Pittsburgh branch sales manager.

1 1 1

TECHNICOLOR MOTION PICTURE PICTURE ON STAINLESS STEEL

The United States Steel Corporation has released a new technicolor motion picture, "An Orchid to Mr. Jordan" which illustrates many of the present-day applications of stainless steel. This 25-minute film centers around a gift of stainless steel orchid to a design engineer. He convinces a friend of the qualities of the metal, and by flash-back technique

(Please turn to page 298)



BRAKE SHOE AND
CASTINGS DIVISION
230 PARK AVENUE, NEW YORK 17, N. Y.

HERE'S WHAT REPUBLIC DISTRIBUTORS DO FOR YOU -



TOWER SUCTION

Smooth bore construction with mechanical reinforcing wire within the wall of hose. Used principally for gritty, sandy, corrosive fluids.

TOWER SUCTION

Rough bore construction has exposed lining of wire and fabric. Good for heavy service but not recommended for water containing grit or fluids having corrosive properties.



Mr. Ray L. Smith, President
Troy Belting & Supply Co.
Troy, New York

How to Select Suction Hose for Your Job

- Since long service life has an important bearing on costs far beyond the purchase price of suction hose, consult an experienced Republic distributor.

Tower is the best all-purpose suction hose that Republic has built in nearly a half century of manufacturing. Republic also makes other high quality brands for special requirements. To select the type of hose which will save you money on the job, it will be well worth your while to consult a Republic Distributor such as Mr. Ray Smith. If you don't find the Republic distributor's name in the classified section of your telephone directory, write or mail the coupon and we will send you his name.



REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN, OHIO
Lee Deluxe Tires & Tubes . . . Conshohocken, Pa.

Pioneers in the use of COLD RUBBER

MECHANICAL RUBBER GOODS BY
**REPUBLIC RUBBER
DIVISION**

WHO REPRESENTS REPUBLIC IN MY AREA?
REPUBLIC RUBBER DIVISION - LEE RUBBER & TIRE CORP.
YOUNGSTOWN, OHIO

Name, title _____

Firm _____

Address _____

City _____ State _____

**Pull-tab Opener
in Every Roll**

**SAFETEX
GUMMED TAPE**

**CENTRAL PAPER COMPANY,
Menasha, Wis.**

(Continued from page 296)
illustrates the modern uses of stainless, explaining the reasons for selecting it.

The film is available in 16 and 35 mm sound versions through U. S. Steel film distribution centers in Birmingham, Chicago, Cleveland, New York, Pittsburgh and San Francisco.

NEW AUTOMOBILE SPRAY CUTS WAXING COST DRASITCALLY

New automobile spray wax made by the Bostwick Laboratories, Bridgeport 5, Conn., makes it possible to do a good waxing job on a car in about ten minutes, at a cost of 53¢, it is claimed. The coating, which is described as No. 1 grade Carnauba wax is marketed in a push button aerosol spray can and is said to make a gleaming, hard, transparent finish which will not water spot, chip, peel or gum-up, and which gives durable protection against road grime, rust and corrosion. The company also offers a similar product for use on woodwork, furniture, leather, and so on. Containers are hermetically sealed, and the company states that contents will not evaporate or dry up.

G. E. ANNOUNCES ELECTRONIC DEVICE TO GUIDE MACHINE TOOL

A new electronic instrument, which can follow the lines of a drawing with an electric eye and guide a machine tool to cut out metal parts according to the drawing, has been announced by General Electric's Special Products Division, Schenectady, N. Y.

Designated as the G-E "contour following system", the new device is connected to a machine tool called a "slave unit", so that the machine's cutting tool reproduces in metal the drawing "seen" by the electric eye. As the "eye" moves along the lines of a drawing, the position of the cutting tool is changed accordingly by means of an electronic servo system, which emits signals to control the lead screws of the machine tool.

This unique contour control was developed by the G-E General Engineering and Consulting Laboratory to solve an unusual problem of machining irregularly-shaped metal parts which are difficult to make by normal hand-controlled machining methods. The equipment has not been applied to ordinary manufacturing processes, according to G-E engineers, but is expected to find application in fields where small quantities of relatively expensive pieces must be produced to close tolerances. In the use of the system, an exceptionally accurate drawing is reproduced on a metal plate. The control then operates to guide the machine tool in accordance with the lines on this plate, thus eliminating much of the layout time, as well as the need for templates or patterns.

Publication GEC-548 gives complete information about the control.

(Please turn to page 300)

HERE'S POSITIVE LOCKING ACTION!

Metal locking ring

Not necessary for bolt to come through nut. Locking ring on bottom of nut.

Thread fit NOT important.

Vibration and shock will not walk nut off—will only force locking ring farther into bolt threads.

Bolt stretch, wear, moisture do not affect gripping power.

Up to softening point of the metal, high temperatures do not lessen locking grip.

Crushed locking ring prevents passage of gas and liquids.

Nut can be re-used many times.

Available in high, thin, cap or spanner designs.

Cross-section of An-cor-lox and bolt showing locking ring after flattening.

NOTE WEDGE ACTION OF LOCKING RING

SEND for TEST SAMPLES and CATALOG

An-cor-lox *Lock Nuts*

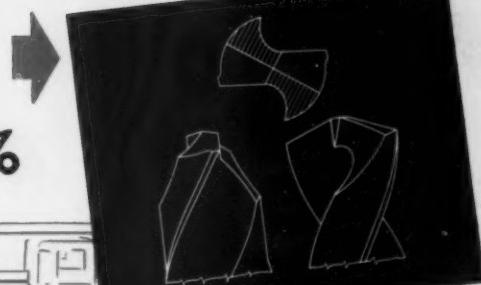
TRADE MARK REGISTERED

LAMINATED SHIM CO., Inc., An-cor-lox Division, 2409 Union St., Glenbrook, Conn.

AN-COR-LOX NUTS • SHIMS • SHIM STOCK • STAMPINGS

CORRECT POINT ANGLE

Increases Drill Life Almost 100%



• Even the finest tool—such as the CLE-FORGE High Speed Drill pictured here—will work better and last longer if it is properly used. ♦ Last year an engine manufacturer was getting only fair results on a certain drill press operation. The drills seemed to be wearing out too quickly. He mentioned this to one of our Service Representatives, who studied the problem and recommended changing the type of point on the drill. Result: Tool life increased almost 100%! ♦ When you have a problem that involves drills, ask our nearest Stockroom to send a *Cleveland* Service Representative, or . . .

Telephone Your Industrial Supply Distributor

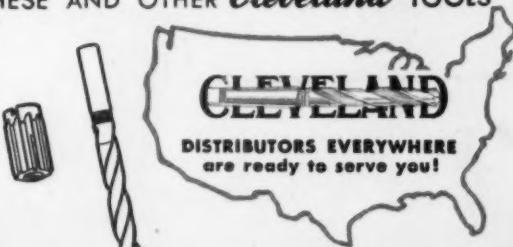
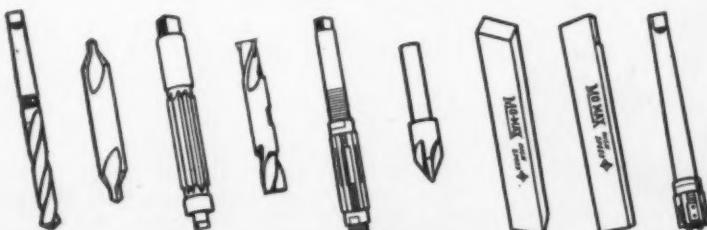
THE CLEVELAND TWIST DRILL CO.

1242 East 49th Street

Cleveland 14, Ohio

Stockrooms: New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5
Los Angeles 11 • E. P. Barrus, Ltd., London W. 3, England

ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER *Cleveland* TOOLS.



DISTRIBUTORS EVERYWHERE
are ready to serve you!



A thin coating of Fuller Floor Wax protects your floors — makes them look better — AND cuts your daily cleaning costs. Use less cleaner — less elbow grease — less time. Your Fuller industrial representative can recommend the type — liquid or paste — best suited for your requirements. Ask him, too, about Fuller Furniture Polish and Fuller Metal Polish to protect and improve the appearance of your furniture and equipment.



Phone your local Fuller Branch Office or write

INDUSTRIAL DIVISION, 3554 MAIN ST.

IN CANADA: FULLER BRUSH COMPANY, LTD., HAMILTON, ONTARIO

HARTFORD 2, CONN.

The **FULLER**
BRUSH CO.

ALUMINUM FLAT BED TRUCK EASY TO HANDLE

The accompanying illustration shows the "Tobey Junior flat bed truck which is built of tough, heat treated aluminum alloy angles and hat sections. Riveted construction is used throughout. The truck, which is made by the Tobey Manufacturing Co., El Segundo, Calif.



The Tobey Junior is of sturdy construction and light in weight

is equipped with 5" diameter aluminum wheels and casters, and is available in two standard bed sizes 24" x 48" weighing 50 lbs., and 30" x 60" weighing 60 lbs. It is non-sparking and non-magnetic, and the maker states that it will take a lot of punishment.

SILICONE RUBBER BONDED TO FIBERGLAS, ASBESTOS, WOOL, OR COTTON

The Stalwart Rubber Company, Bedford, Ohio, announces the availability of silicone rubber bonded to fiberglass, asbestos, wool, or cotton. Bonding this versatile synthetic rubber to these materials greatly increases its strength and its suitability for high pressure gasket and diaphragm applications.

To date, both molded and die-cut parts can be fabricated from the new bonded materials. When bonded to either fiberglass or asbestos, silicone rubber parts will remain unaffected at temperatures ranging from -160 to more than 400 degrees Fahrenheit. When silicone rubber is bonded to wool, the fabricated parts are suitable for applications involving constant temperatures up to 300 degrees F. and intermittent temperatures up to 400 degrees F. Bonds of silicone rubber and cotton will withstand temperatures up to 250 degrees F.

Parts fabricated from the new bonds of silicone rubber and fiberglass, asbestos, wool, or cotton will not turn to carbon at respective maximum heats and will withstand permanent compression, prolonged weathering, and hot lubricating oils.

Silicone rubber is recommended for use in handling hot or cold fluids and gases and for other applications in which rubber is subject to extreme hot or cold conditions. Parts will not crack, become hard or brittle, and will not deteriorate after long exposure to air, ultra violet rays, and ozone.

Because of its excellent dielectric properties, silicone rubber is recommended for numerous electrical applications.

(Please turn to page 302)

TUBING SIZE MARKED ON NUT for quick size identification

On Compression and Flare Types



"Look For the Diamond 'I'
On Every Fitting You Buy"

In addition to the outstanding advantage of FORGED Bodies, Extra Length Pipe Threads and Size Marking On Nuts, Imperial Tube Fittings feature accurately machined threads and seats, adequate wall thickness, flats for wrench hold and consistent rigid inspection throughout.

one of the many extras
that build preference for
IMPERIAL
TUBE FITTINGS

This marking makes it so much easier to find, identify, sort and check size of fittings. Prevents mixups—a lifesaver when you're in a hurry.

Here are two other important extras:

FORGED *

- ★ For Greater Strength
- ★ For Extra Toughness
- ★ For Closer Grain Structure
- ★ For Greater Uniformity

*Elbow and Tee Bodies

Extra Length Pipe Threads

Full length S.A.E. pipe threads on all pipe ends. They give extra assurance of tight joints and provide for additional take-ups when reconnection is necessary.

IMPERIAL TUBE WORKING TOOLS . . . their quality speeds your work

HI-DUTY TUBE CUTTER

Free-wheeling ball bearing action makes cutting easier, faster. Cuts hard or soft tubing. Roller type with flare cut-off groove. Makes clean, right angle cuts. Retractable reamer. No. 274-F . . . for $\frac{1}{8}$ " to 1" O.D. tubing.



SEE YOUR INDUSTRIAL DISTRIBUTOR

FLARING TOOL WITH

SLIP-ON YOKE

Has Imperial's exclusive quick slip-on yoke of forged steel. Makes proper 45° flares on copper, brass or aluminum tubing. No. 193-F flares $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{7}{16}$ ", $\frac{1}{2}$ " O.D.



HAND TUBE BENDERS

Calibrated open-side bend-ers. Make smooth, well-formed bends to a short radius . . . any angle up to 180°. No. 364-F . . . individual benders for each size of tubing from $\frac{3}{16}$ " to $\frac{3}{4}$ " O.D.



Ask for Catalog No. 350

THE IMPERIAL BRASS MFG. CO., 512 S. Racine Ave., Chicago 7, Ill.

IMPERIAL

Specialists in

TUBE FITTINGS OVER 2000 STOCK ITEMS.

Catalog 350 shows a wide range of sizes, types and styles. Write for copy.

"Look for the Diamond 'I' on every fitting you buy!"

WORTH ASKING FOR
by name...



**PANTHER
and DRAGON TAPES**

What's in a name? A great deal—when the name is Okonite. And Okonite makes Panther and Dragon commercial tapes. Okonite knows the electrical and working characteristics required for friction and rubber tapes because they have been manufacturing outstanding insulated wires and cables for over 70 years.

By asking for Panther and Dragon you get good commercial tapes with good working qualities assured. They're clean to handle... easy to wrap... stay wrapped... won't ravel. Besides, you get these added values...

- Fresh when packaged—packaged to *stay* fresh.
- Reliability in every splice.
- Guaranteed footage as stated on the package.
- Surpass ASTM and Federal Specifications for mechanical and electrical properties.
- Sold only through recognized wholesalers.

Better tapes for better splices are made by
The Okonite Company, Passaic, N. J.

Ask for them by name...

Panther and Dragon

friction and rubber tapes

MATERIALS HANDLING 50% OF COST OF MAKING GREY IRON CASTINGS

Handling and rehandling of materials constitutes 50% of the cost of making small grey iron castings in the average production foundry, according to Frank R. Elliot, foundry superintendent of the Westinghouse Electric Corporation's appliance plant at East Springfield, Mass. Conveyorizing the Westinghouse foundry has eliminated the manual lifting of 22 tons a day by each molder, and at the same time has boosted each worker's productivity by more than 50%, he said at the spring meeting of the American Society of Mechanical Engineers. In addition the conveyors "apparently" solved the problem of getting people to work in the foundry.

In addition to the 450 feet of conveyors installed at the foundry Mr. Elliot supervises, a recently completed \$1,250,000 modernization program there included replacing more than a dozen rigorous hand operations by mechanical, automatic and push-button devices, and the installation of a new ventilation and dust removal system.

Total weight formerly handled every day by the foundry's 75 employees was 1,470 tons. Today, it's only 294 tons. Top weight of 65 tons each was formerly handled by a group of five shake-out operators—men who remove the sand and castings from the poured molds. Today their operation is completely mechanized.

Among the various labor and cost-saving techniques that some foundries have instituted, Mr. Elliot described: the use of automatically controlled skip hoists in place of charging crane; mechanical charging; storage of miscellaneous materials on pallets; powered industrial trucks with scoops or forks; hand lift trucks; use of skids made of the ingot material for moving bundles of ingots; mechanical equipment for handling the pouring weights and jackets from mold to mold; conveyors for all stages in molding process; and mechanical sand handling equipment.

NEW RUST-PROOFING PAPER COATED WITH VAPORIZING CHEMICAL

It is now possible to rust-proof tools, engine parts, fine instruments, and other metal articles without greasing or sealing airtight, simply by wrapping them loosely in a chemically treated paper, according to Dr. M. E. Spaght, president of Shell Development Company. Shell Development is the research affiliate of Shell Oil Company, San Francisco, Calif.

Key to the new method of preventing rust is a special chemical developed by Shell and marketed under the trademark VPI, for Vapor Phase Inhibitor. Ordinary kraft paper is coated on one side with VPI. Then, after a metal article has been wrapped in this paper, the chemical slowly vaporizes inside the package, neutralizing the corrosive action of moisture in the air.

VPI means both lower packaging costs for manufacturers and greater convenience. (Please turn to page 304)

SIMONDS



**This Line is made only in Top Quality
...and SOLD ONLY THROUGH TOP DISTRIBUTORS**



WORLD'S FIRST WINDOWLESS PLANT—HOME OF

SIMONDS
CUTTING TOOLS

FOR METAL, WOOD, PAPER, PLASTICS

SEPTEMBER, 1949

Want Additional Product Information? See Page 19.

303

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Avenue, Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington. *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

SIMONDS SAW AND STEEL CO. FITCHBURG, MASS. Other Divisions of SIMONDS SAW AND STEEL CO. making Quality Products for Industry	SIMONDS ABRASIVE CO. PHILADELPHIA, PA. Grinding Wheels and Grits	SIMONDS CANADA SAW CO. LTD. MONTREAL, TORONTO, VICTORIA Saint John, N.B. Simonds Products for Canada
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SECO... The Great Improvement In Work Gloves

Here is a revolutionary new work glove . . . SECO. High quality cotton fabric is coated with an Arcadia-Processed synthetic.* Result . . .

SECO MEANS:

SAFETY—in a wide variety of uses;
ECONOMY—the coating l-a-s-t-s;
COMFORT—flexibility with finger freedom;
OK'D by Industry—proved in test and in operation.

Not an experiment. There are already hundreds of industries saving important money because the Seco Arcadia-Processed coating just doesn't wear out. Can Seco gloves outwear the kind you are now buying 5 to 10 times? It's being done!

Seeing Secos is Believing

Write us; we will get a sample to you. Seco Work Gloves are available in the following models: Knit Wrist, Gauntlet, Band-top, and Open Back.

Seco is the registered trademark of Seco Safety Products Company.

*The coating is a process of Arcadia Manufacturing Co., Birmingham, Michigan.

SECO SAFETY PRODUCTS CO.

1437 Brooklyn • Detroit 26 Michigan

Branches at Grand Rapids, Michigan, and Chicago, Illinois

(Continued from page 302)
ence for customers, according to Dr. Spaght, since it does away with both application and removal of grease or other protective coatings. It ensures delivery of articles rust free and ready for immediate use.

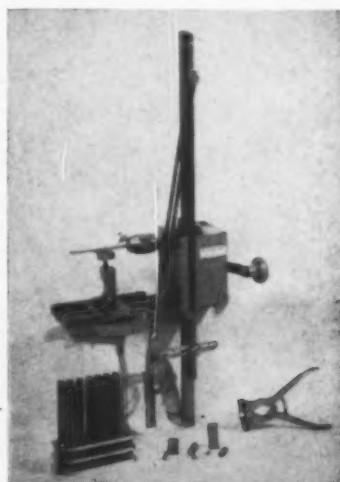
Several types of prefabricated packages may be made with VPI-coated stock, such as corrugated cartons, envelopes, bags, or pre-formed VPI paper sheaths tailored to fit the article to be protected.

Depending on the tightness of the wrapping, VPI paper provides complete surface protection for periods ranging from a month to more than five years, even under severe conditions of temperature and humidity. For average use, in which protection is needed for only one or two years, simple fold closures of the paper, secured by string or gummed tape, are adequate. For long term protection, tighter closure with foil wrapping is recommended, but the package need not be hermetically sealed.

1 1 1

SEMI-AUTOMATIC SPRING COILING MACHINE FOR SMALL LOTS

A semi-automatic machine for winding both left-hand and right-hand compression, extension and torsion springs, is being marketed by the Carlson Company, 277 Broadway, New York 7, N. Y.



Springs can be made from any spring material, up to 4" in length and up to 25 coils.

The machine is said to be especially useful for coiling small quantities of springs (up to about 100) and for making samples. The set-up time is only a few minutes, and an operator can usually complete between 25 to 35 small lot orders per day. Springs can be wound from spring steel, music wire, stainless steel, phosphor bronze or any other spring material.

Capacity of the machine is wire diameters up to .063"; outside diameters up to $\frac{3}{4}$ " (larger OD obtainable with special arbors); overall lengths up to 4" approximately. Pitches are adjustable from zero up to a wide range. The net weight of the machine is 25 pounds.

(Please turn to page 306)

**skilled springmakers...
AND practical,
experienced engineers,
SPECIALISTS
in spring design
and manufacture**



IT takes people to make springs. Ours are specialized, highly trained, long-experienced people—well qualified to give you the finest in spring craftsmanship.

Our engineers too, are an important reason why you'll like Accurate Spring Service. They're old hands at spring-making . . . they've developed manufacturing systems and procedures that enable us to handle your jobs with the greatest speed and efficiency.

These Accurate engineers are at your service on spring design problems. You will benefit from their practical assistance in designing exactly the right spring for your application.

Why not try Accurate on your next job?



A dependable source of supply!

ACCURATE SPRING MFG. CO.

3825 W. Lake St. • Chicago 24, Ill.

Springs, Wire Forms, Stamping



A flange broken 50 years ago...

...led to one thing,
to another, to another...

When Taylor Forge started up, way back, with spiral pipe it was our No. 1 item (still important). In those days cast iron flanges were largely used, and the troubles resulting from flange breakage were frequent and aggravating. The remedy for this major headache was found in the development of forged steel flanges; first for our own spiral pipe, later for our straight seam, and in fact any pipe; finally for general pressure vessel and industrial application.

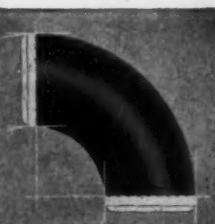
That put us definitely in the forging business some forty years ago and was the start of a long pioneering journey into the field of engineered piping problems. The expanding needs of industry multiplied the response for larger, heavier, stronger, and tougher flange and ring forgings to which we reacted with new, heavier, and numerous units of forge, press, and rolling equipment. It was equally necessary to pioneer design methods, not only for flanges and pipe application, but for other pressure vessel components as well—so that almost automatically we became, and remain, the world's largest manufacturer of forged (or forge-rolled) steel flanges, welding necks, manways and nozzles, etc., for *any* application.

Then came rapid strides in the art of welding which quickly cancelled out the crude, cut-fit-patch methods first attempted in pipe systems. Again we found it necessary to *engineer* the design of suitable components. Several years of research preceded the development of the *full*, engineered line of Taylor Forge welding fittings—the well-known WeldELL line. Examine the illustrations to the right, and note how many unique features combine good engineering with good sense and ultimate economy. The coupon below is the convenient means for getting more information about the fittings that have "Everything."

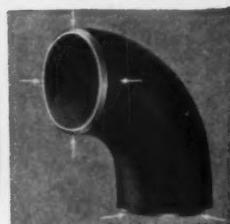
WeldELLS have everything



1. Forged and formed seamless throughout.



2. Sized end tangents on every fitting.



3. Precision quarter-marked ends that guide the work.



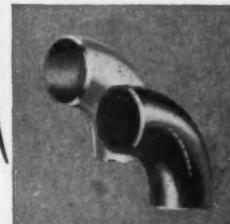
4. Engineered for full strength throughout.



5. Markings on every fitting clear and complete.



6. Cleanly machined bevels and lands.



7. All materials: Carbon and alloy steels; corrosion resistant alloys.



8. The world's widest range of types, sizes and weights.

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS General Offices & Works: Chicago 90, Ill. (P.O. Box 485). Eastern Plant: Carnegie, Pa. Western Plant: Fontana, Calif. • District Offices—New York: 50 Church Street • Philadelphia: Broad Street Station Bldg. • Pittsburgh: First National Bank Bldg. • Chicago District Sales: 208 S. LaSalle Street • Houston: City National Bank Bldg. • Los Angeles: Subway Terminal Bldg.

Please send a copy of your new catalog 484 covering welding fittings and forged steel flanges.

Name _____

Position _____

Company _____

Street address _____

City _____ Zone _____ State _____

Mail to Taylor Forge & Pipe Works, P.O. Box 485, Chicago 90, Ill.

517-0949

Take a tip from



"It's final cost...not PRICE...that concerns the P.A."

SURE, the Purchasing Agent looks at price. But he's even more interested in what he gets for his company's dollar. "Buying quality as a means of lowering costs—paying twice as much to get three times the service—purchasing equipment that insures increased production—it's on this basis that the modern Purchasing Agent selects supply sources. It's the final cost, *not* the price alone, that determines good buying," says Mr. W. J. Shea, Vice President of Essex Wire Corporation.

"As manufacturers of high quality magnet wire, we make it a point to sell the P.A. on how his company's end products will be improved by its use," Mr. Shea says. "That's what P.A.'s want to know, first and last."

With the return of competitive selling, Purchasing Agents are on the alert for *news* of products, materials or equipment that offer cost-saving opportunities. Make your company and products *known* to the key man in industrial buying through consistent, informative advertising in *Purchasing*.

The purchasing executive's No. 1 supply source for information, *Purchasing Magazine*, is read regularly by P.A.'s controlling 85% of industry's purchases. There is no better way, no other way to reach so efficiently the most important men in industrial buying. Write to: *Purchasing*, 205 East 42nd St., New York 17, N. Y., Offices in Chicago, Cleveland, Dallas, Los Angeles.

PURCHASING

THE NATIONAL MAGAZINE FOR PURCHASING EXECUTIVES



A CONOVER-MAST
PUBLICATION

P-K Assembly Engineering Service

helps you
start here
to Save



P-K Assembly Engineers are specialists who question every fastening, and point out how to save operations, simplify assemblies, add product strength. First step is a thorough study of your product in the design stage, or on the assembly line. Often they can show that standard sizes and types will serve as well as specials, and thus avoid extra expense.

up to 50% or MORE on Fastening Costs



When required, tests of recommended fastenings are made in Parker-Kalon's Engineering Service Laboratory.



All recommendations are combined in a complete report furnished as a guide for assembly operations.

Qualified by thirty-five years' experience, Parker-Kalon Assembly Engineers can sit in with designers and assembly supervisors and *show how* to adapt the simpler, operation-saving P-K method, how to cut out all needless fastening expense. That's one of many reasons why . . .



**FASTENING-WISE MANUFACTURERS
CALL ON PARKER-KALON**

Look at all these other advantages...

ting equipment is unsurpassed.

MORE Production—Parker-Kalon is the world's leading manufacturer of Self-tapping Screws.

MORE Types and Sizes—With a complete line of Self-tapping Screws for every metal and plastic assembly, P-K's advice is unbiased.

MORE Exacting Quality Control—P-K's investment in laboratory testing and inspection

is unsurpassed.

MORE Top-Rated Distributors—Everywhere throughout the nation P-K Self-tapping Screws are readily available.

PROMPT DELIVERIES from stock on most types and sizes.

Call in a P-K Assembly Engineer and find out where you can start making savings you've been missing. If you prefer, mail assembly details for recommendations. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y.

P-K[®]

The Original
PARKER-KALON SELF-TAPPING SCREWS
FOR EVERY METAL AND PLASTIC ASSEMBLY



P-K Also Makes
Cold-forged
THUMB SCREWS
WING NUTS

OTHER P-K PRODUCTS: Cold-Forged Socket Screws, Wing Nuts, Thumb Screws • Hardened Screwnails and Masonry Nails • Shur-Grip File and Solder Iron Handles • Metal Punches • Damper Regulators and Accessories

Save Real Money

ON HIGH QUALITY, NON FERROUS
BEARINGS • BUSHINGS • WEARING PARTS
 machined or rough cast

American Crucible methods, experience, know-how and equipment spell big savings for you.

Your inquiry can pay you handsomely. Each part produced from



is of the specific formula best suited to the application thus assuring longer service. Castings to your patterns — any size, shape or section up to 3,000 lbs. We also do pattern making, designing and machining.

Promet Bronze Bar Stock also is available round, hexagon and square. Rough cast or semi-finished. Cored stock, all sizes by $(\frac{1}{8} \text{ inch})$ steps from $\frac{1}{2}$ " minimum core to 12" O.D. and 13" lengths. Six grades of hardness.

We give you as a user of Promet — the engineered bronze — a money-back guarantee of longer bearing service and lower maintenance cost.

Let us quote you on your requirements and make recommendations as to alloys. You are invited to submit blueprints, conditions of operation and other data. When Promet accepts your bearing and wearing responsibilities, we guarantee satisfactory results. Write for literature and other information now.

THE AMERICAN CRUCIBLE PRODUCTS CO.
 1319 Oberlin Avenue
 Lorain, Ohio, U. S. A.

INSURE AGAINST COSTLY ILLEGIBLE MARKINGS WITH PERMANENT, LEGIBLE, EASY-TO-USE



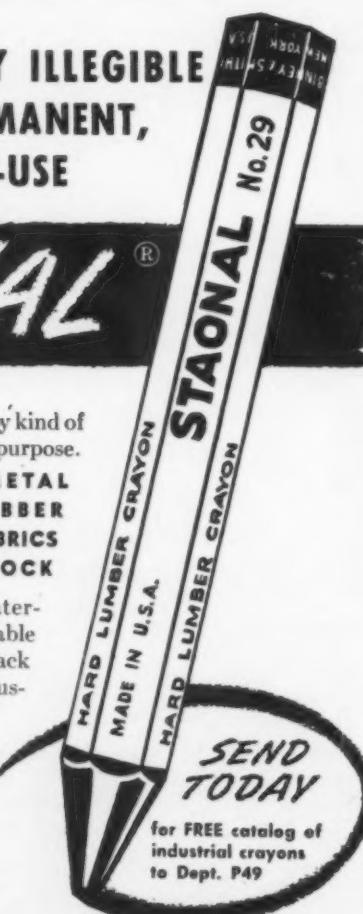
There's a special Staonal Crayon for every kind of surface and every marking or checking purpose.

**PAPER • WOOD • GLASS • METAL
 CHINA • TIN • LEATHER • RUBBER
 WET LUMBER • DRY LUMBER • FABRICS
 CELLOPHANE • STONE • LIVESTOCK**

Staonal Crayons are indelible and waterproof or removable, as required. Available in a wide variety of colors, including black and white, they are created to meet industry's most exacting needs.

BINNEY & SMITH CO.

41 East 42nd Street
 New York 17, N. Y.



BOTTLE UNCASER AND WASHER-LOADER ANNOUNCED BY RCA

A new bottling plant machine which makes possible high-speed unloading of beverage bottles from cases and provides automatic feeding at uniform rates to the bottle washers, was announced by the Radio Corporation of America, Camden, N. J.

The new device—to be known as the RCA Uncaser and Washer-Loader—is fully automatic and can feed bottles to the washer at rates up to 500 bottles a minute. The machine eliminates one of the last steps in the beverage bottling cycle now being performed by slow and laborious manual methods.

The machine is readily adjusted to any half-depth case, and is available in sizes to accept 6 to 12-ounce bottles. The machine may be used with most of the leading types of cartons now on the market.

The new machine was invented and developed by Brian Copping, of Atkron, Inc., of Cuyahoga Falls, Ohio, and will be manufactured for RCA by Atkron. The equipment, which has been inspected and fully tested by RCA beverage equipment engineers, will carry the RCA name and guarantee, and will be sold through the Beverage Equipment Section of RCA.

MOBILE WELDING UNIT



The accompanying illustration shows mobile welding unit manufactured by Hobart Brothers Company, Box 389, Troy, Ohio, for quickly and efficiently making welded repairs around railroad yards, oil refineries, steel mills, quarries, gravel pits and other industries having extensive operations.

The company states that it can be used as a complete maintenance and repair outfit in any location, eliminating the need of electrical connections for electric drive arc welders or towing equipment for trailer mounted arc welders.

It is equipped to roll to the job under its own power and make on the spot repairs with arc welding, oxy-acetylene welding and cutting, and power tools. A universal coupler is provided on the rear to permit towing of additional equipment.

Two models are now being produced, the GR-301-M, with a 300 ampere welder for light to heavy welding requirements, and the GR-401-M with a 400 ampere welder for medium to extra heavy welding. Either unit can be furnished with 1 or 3 KW auxiliary d-c power for supplying lights and universal power tools.

**SEE CLASSIFIED SECTION
 PAGE 334**

HOW TO WIN A SALES WAR...



make your Alcoa Distributor your Ally

"Git thar fustest with the mostest" applies to your war, too—your own competitive war.

"Gitting thar" starts with your materials deliveries. That's why it pays to have your Alcoa Distributor on your side.

Why not make a note now of your Alcoa Distributor's name and telephone number?

He'll give you fast delivery on all standard Alcoa Aluminum warehouse items. And, if you need help on technical problems, he can supply that, too—with technical literature based on the solid foundation of Alcoa's sixty-one years of aluminum experience. ALUMINUM COMPANY OF AMERICA, 1931J Gulf Bldg., Pittsburgh 19, Pa.

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Phone: 5-3361

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- Pacific Metals Company, Ltd.
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ENterprise 1-0806

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INGOT • SHEET & PLATE • SHAPES, ROLLED & EXTRUDED • WIRE • ROD • BAR • TUBING • PIPE • SAND, DIE & PERMANENT MOLD CASTINGS • FORGINGS • IMPACT EXTRUSIONS
ELECTRICAL CONDUCTORS • SCREW MACHINE PRODUCTS • FABRICATED PRODUCTS • FASTENERS • FOIL • ALUMINUM PIGMENTS • MAGNESIUM PRODUCTS

Brighter Floors with

DOLCOWAX

First in importance in a floor wax is durability. Actual comparative traffic tests show that DOLCOWAX is out front in scuff resistance and long-wearing service — the result of precise blending of fine ingredients including selected grades of carnauba wax. ONLY carnauba wax is used.

DOLCOWAX spreads and levels well . . . forms a hard, durable coating, highly water-resistant. It preserves flooring and helps to lengthen the life of expensive linoleum, cork, rubber and mastic.

Write for complete illustrated booklet "Floor Maintenance" and folder "How Do You Judge a Wax?"

DOLCOWAX

The C. B. DOLGE CO.
WESTPORT, CONNECTICUT

MATERIALS MANAGEMENT

(Continued from page 105)

Materials Incoming Inspection and Quality Control

Depending upon the individuals concerned, the functions might vary. Thus, perhaps most purchasing officers would not include the incoming inspection of materials if this were to constitute a definite materials division. However, there is ample precedent among actual companies and among such authors as Gushee and Boffey to include it as a definite part of materials management.

Using the same criterion of span of attention and control these rather general factors were selected:

Planned purposes or objectives
Direction, including executive leadership and policies

Organization structure and functions

Standards of performance, coordination and control

Principles

Several factors have been grouped together in this presentation but they could be broken down further. The functions can be arranged along the top as the warp and the factors down the side as the woof. This is shown in Exhibit A. The tapestry can then be woven into a complete whole. Some of the strands might carry only part way through the organization, others will carry all the way across. The pattern might differ. But once woven, there is a continuity and logic in arrangement which allows comprehension of the entire program.

An abbreviated illustration of a completed tapestry of integrated functions and factors is shown in Exhibit B. If well done, there will be a place for any fact concerning the organization for materials management and at the same time it will be in its proper relationship with other equally important facts.

The principles derived in the illustration presented are simple statements of common sense. Yet one does not have to look far to see violations of them. This is often because, in the press of activities, otherwise competent men lose sight of the forest for the trees. The warp and woof approach emphasizes what has been recognized in economics as the "law of proportion of factors," which Turgot recognized in 1768. H. J. Davenport (*Economics of Enterprise*, 1913) emphasized this law by the following:

"Everything in proportion; the great bad, as Jane Carlyle remarked, is mixing things—badly."

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longer wear

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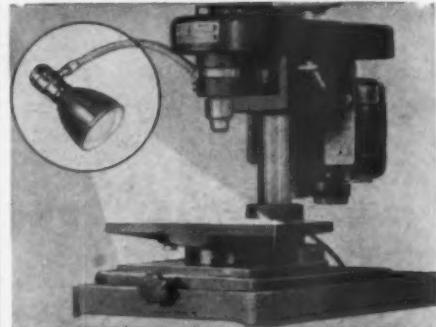


New Hood gauntlets and knit wrists provide new comfort, better fit, longer wear for vital hands. In addition, there's ample knuckle allowance, curved fingers and thumbs, reinforced thumb crotch, no seams on working surface, color fast knit wrists. Be sure of new protection, new efficiency. Order from your jobber today!



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DIVISION OF THE B. F. GOODRICH CO.



FOR BETTER SIGHT —

VIMCO *light*

INCREASED ACCURACY —

VIMCO *light*

LOWER-COST PRODUCTION —

VIMCO *light*

Flexible arm with swivel socket, — base for every application, easy to install. Send for Bulletin 74.

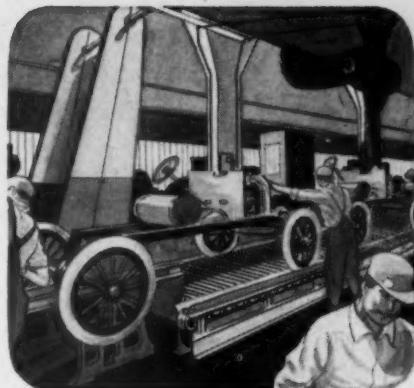
VIMCO MANUFACTURING CO.
121 Brayton St., Buffalo 13, N. Y.



1 1875—Wisconsin offered a \$10,000 reward to the person who would invent a steam carriage. George Seldon, Rochester, N. Y., was first and collected... America's great auto industry was under way.

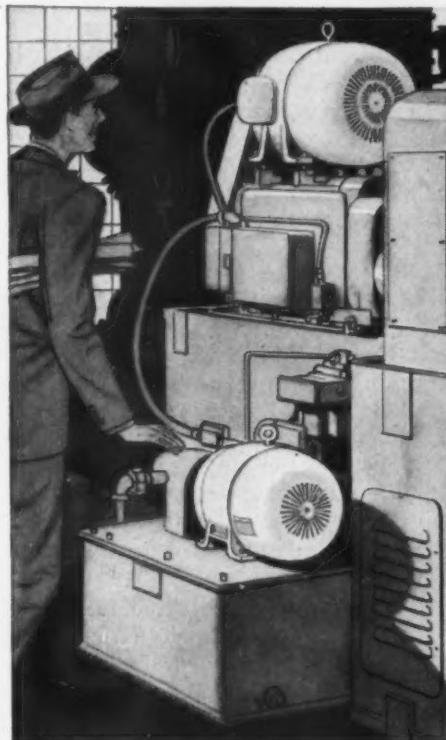


2 1892—First gasoline-driven car was built by Charles Duryea with screw drivers and wrenches. Machine tools to aid this growing industry soon appeared. But parts still had to be assembled by hand.



3 1913—First moving assembly line was used in auto plants! Gone, now, was much of the labor of carrying parts. In 1915, Howell "Red Band" Motors appeared and soon were widely accepted in industry.

FAMOUS AUTOMOTIVE FIRSTS! REMEMBER?



Free enterprise encourages mass production, supplies more jobs—provides more goods for more people at less cost.

Howell totally enclosed, fan-cooled motor—windings completely sealed against dirt and weather.



4 Today—Through the magic of electrical horsepower, more "firsts" occur almost daily. For example, this automatic boring and facing machine, equipped with two Howell totally enclosed, fan-cooled motors, automatically bores and faces side gear pockets of differential cases for the first time.

The application of specially designed machines, powered by Howell industrial type motors, has done much to increase production, cut costs, and improve quality in many industries.

These rugged, industrial type motors are also an important source of power on conveyors, pumps, cranes, air conditioning, dairy machinery and other vital equipment.

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HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.
Precision-built Industrial Motors Since 1915



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Page for Wire— Especially Stainless

Remember that the next time you are looking for a responsible source for stainless steel wire. Wire has always been the business of PAGE. And PAGE has been working with stainless ever since its earliest development.

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Philadelphia, Portland, San Francisco,
Bridgeport, Conn.



PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

Good Buy, Mr. Chips

(Continued from page 106)

chines are worth when they are running, and you will find that your tool—which may cost so little on the purchase order—has multiplied its cost many times.

Who grinds your tools? Does the operator do it? If so, how much productive time is he using up for this operation? Can he sharpen the tools as good as new? Or does the tool produce more chips one time and fewer the next? Train a man to grind all tools, and let him grind all of them and grind them right.

Another thing: consider your tool inventories. Their cost can run up into big figures—more than you may realize. Here you can do some more saving. Buy standard tools as far as possible, and adapt them by grinding them to special shapes when and where required. Your reserve of tools can be kept lower that way, spread out over many applications. Standard tools cost less, first of all because a standard tool doesn't require special engineering. In addition, the cost per tool for any tool usually goes down somewhat when you are able to buy that tool in quantities instead of one or two at a time.

Any good tool manufacturer can give you a pretty good idea of how much you should be able to produce in the way of chips with a given tool under a given set of conditions, whether it's a high speed steel or a carbide tool. Ask him. If you're not getting that kind of production, something is wrong and your production costs are unnecessarily high. Maybe you are using three machines and operators to do what only two machines or one machine should be able to turn out with the right tooling. Don't take it for granted that

your plant is an exception to the rule. It happens in the best of plants. Your production people, tool engineers, and purchasing men ought to get together and check up.

Don't take it for granted that you can't use a certain type of tool in your operation although you think, "It would be great if we could, but our machines are too old or too slow." It's quite remarkable sometimes how much more some of these older machines can turn out with modern tooling.

Look for the trouble spots. Is the shop complaining that castings are coming through with too many hard spots? Or forgings with too much scale? What the shop really means is that it is having trouble cutting them. Look at the tool; maybe the trouble is there. The right tool might go right through that scale and those hard spots. If you don't find the answer yourself, put it up to the tool manufacturer. He is used to troubles. Your tool problems won't bother him a bit.

How much do your tool supervisors and operating men know about what has happened in cutting tools recently? Have they been getting around? Have they been "out" to study what is new in the tool field? Some tool manufacturers operate excellent schools where your key men can get up-to-the-minute training on the latest tools, application ideas, maintenance methods, and all the rest of those things which can make the cutting tool spell the difference between profit and loss when you're close to that break-even point.

The old saying, "For want of a nail, etc.", has no truer application than when it comes to cutting tools. For want of the right kind of tools, correctly selected, applied, and maintained, your profits—and maybe your business—could be lost.

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SHEETS STRIPS GASKETS

Can be delivered to your specification in three days at the country's most competitive prices from the country's newest and most modern rubber works.

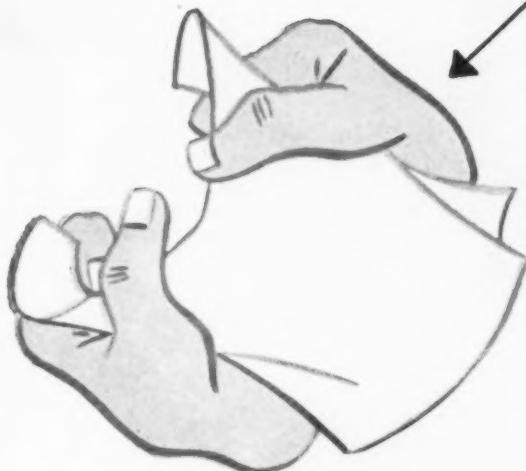
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An untearable paper is only one of more than 600 different kinds of paper made in the Riegel mills—many with technical properties that would surprise you. Perhaps one of these Riegel grades can help you. If not, we can probably create a new paper . . . "tailor-made" to your most exacting requirements. Just tell us what you are looking for, or send us a sample. If we can't make it, we will gladly tell you who can.

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450 SOUTH MILL STREET • NEW CASTLE, PA.

Management From The Bottom Up

(Continued from page 102)

people qualities which, when a higher rank vacancy occurs in other departments, will be accepted as capable for management places in every rank. This has been happening in our organization. In companies which give little authority to the department, you will get more authority by rating it. Push for it. Fight the boss for it.

All companies need departments which establish for themselves great importance. This means a carry-on that proves initiative, and the ability and courage to fight for what seem sound policies. Mistakes are an inevitable by-product. Management knows if you are not strong there will be only minor ones; they will, at the same time, be accepting that your part in the company will be only a minor one.

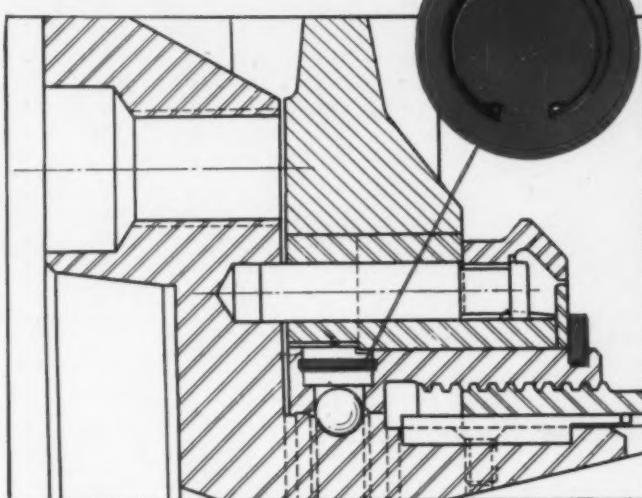
If you are considered strong, mistakes will be taken for granted and your courage and forcefulness recognized. Personally, I would be scared if I found myself recommending for promotion a man in whose record there were not any serious mistakes. It is how he carried on after them that usually best shows his calibre. Your impact on profits and your impress on sources of supply are what count.

Years ago, I told the head of our Accounting Department that in my opinion he and his people were only historians, and that as such none of them would ever rate much pay—replacements were too easy. In normal times, a telephone call to an employment office filled any such vacancy. They could be important only by their impact on earnings. This meant finding ways to make figures talk louder to operating people, sales people, and all bosses. It meant highlighting bad spots and hounding bosses who did nothing about those bad spots. In recent years, people in our accounting have been contributing more and more to our future. They are constructively helping operating and sales people to more intelligently help themselves. For the first time in nearly fifty years of our existence, a Treasurer of our company has become a Vice President. He made that department a vital factor in our company. It is on the positive side, not the negative side, of making money.

Opportunity Ahead

There is a period ahead when every purchasing department will have an unusual opportunity to
(Please turn to page 316)

2 Waldes Truarc Rings Save Space ...cut costs...Lock entire chuck



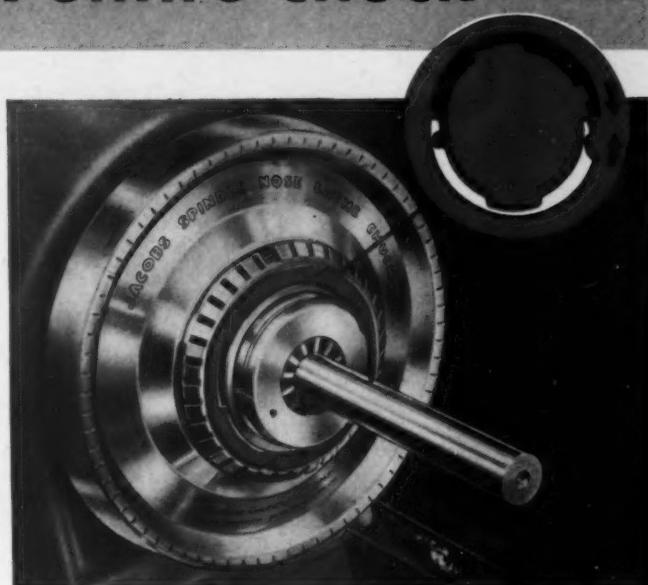
INTERNAL RING: Used instead of a shoulder screw, Truarc internal ring #5000-37 locks disc over ball loading hole. Saves 1/8 inch in overall diameter. Eliminates tapping. Withstands machine vibration and vibration from impact device within chuck. Used with Truarc pliers, it facilitates assembly and disassembly.

2 Waldes Truarc Retaining Rings secure the entire mechanism of new spindle nose lathe chuck for Jacobs Mfg. Co., Hartford, Conn. Truarc gives Jacobs a finer, more compact product, and at lower cost than possible with any other fastening device.

Wherever you use machined shoulders, nuts, bolts, snap rings, cotter pins, there's a Truarc Ring that does a better job of holding parts together.

Truarc Rings are precision engineered. Quick and easy to assemble, disassemble. Always circular to give a never-failing grip. They can be used over and over again.

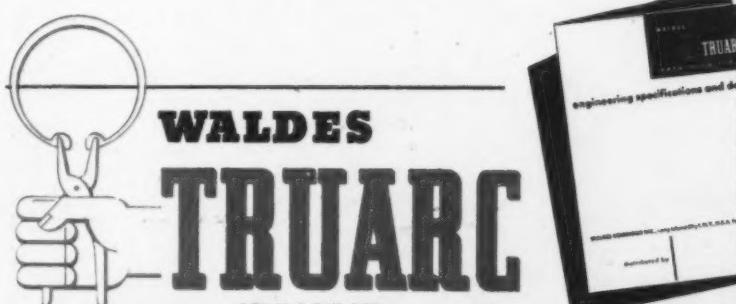
Find out what Truarc Rings can do for you. Send your drawings to Waldes Truarc Engineers for individual attention, without obligation.



INTERLOCKING RING: Used instead of a locknut, Truarc interlocking ring #5107-343 locks handwheel assembly securely on impact sleeve of Jacobs chuck. Saves 7/32 inch in overall length. Eliminates tapping. Chuck's top speed: 5000 RPM; Truarc ring is dynamically balanced to withstand 50,000 RPM's. Services easily with a screwdriver.

2 TRUARC RINGS GIVE 6 BIG ADVANTAGES

- Cut overall length 7/32 in.
- Cut overall diameter 1/8 in.
- Eliminate cost of tapping
- Withstand up to 50,000 RPM's, give a factor of assurance of 10
- Withstand machine vibration
- Facilitate assembly, disassembly



WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS ARE PROTECTED BY U. S. PATS. 2,002,948; 2,026,454; 2,416,882 AND OTHER PATS. PEND.

Waldes Kohinoor, Inc., 47-16 Austel Place
Long Island City 1, N. Y.

P-91

Please send 28-page Data Book on Waldes Truarc Retaining Rings.

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Title _____

Company _____

Business Address _____

City _____ Zone _____ State _____

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NOW YOU CAN GET

Sterling WOOD HANDLE WHEELBARROWS



No. 55W — for handling sand and other dry materials. 14 ga. tray. Max. cap. 4 cu. ft.

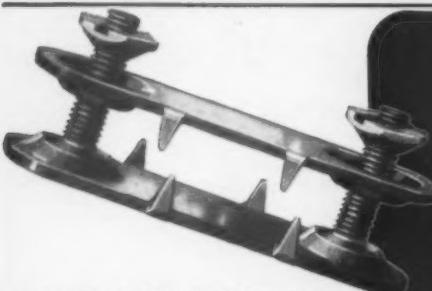
You'll like these new, lightweight, easy-wheeling Sterlings, designed for faster material transport service. Famous Sterling balanced construction puts 80% of the load on the wheel . . . only 20% on operator. Equipped with long wood handles, formed to fit operator's hands. Steel channel legs and reinforcements are just the right height. Means less stoop for operator and greater leg clearance. Steel wheel, roller bearing wheel with pneumatic tire or zero pressure cushion type wheel, can be furnished. Write for new Wheelbarrow Catalog.

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AND ELEVATOR BELTS OF
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Strong, Smooth, Readily Troughing
Order From Your Supply House

Management From The Bottom Up

(Continued from page 314)

prove of great importance to profits. Then you will be fighting operating departments and officers to recognize the possibilities in earnings which can flow from increasing inventories. It may turn out that you jumped the gun a bit, but remember that a price near the bottom of a recession is a good price. No one is omniscient, or expected to be. The common sense and the courage you prove will be recognized and remembered.

There will be the need to go all out in your fight for your convictions. Soon Brake Shoe will be down to the point where every plant is operating with inventories dangerously low. Some day we will be increasing their volume because prices have reached a point which seem to make some materials a good buy. Some day we will increase those tons on a downward price scale. I hope there will be a lot of bets between company people as to the proper place to begin. A reviewed decision is a better gamble than one made on the spur of the moment.

It is well to begin guessing now as to what the near bottom and bottom will be as to the prices of different materials important to your company. It is all right to stick your neck out—certainly when everyone knows you are just guessing. There is ahead a great opportunity for all purchasing departments to come into their own. It may be a better chance than you will again experience to prove the money-making possibilities of a purchasing department.

Sources and Uses of Specifications

(Continued from page 140)

required specifications. The Purchasing Agent examined it and sent it to his list of suppliers and obtained their suggestions. The specifications were then altered to fit the available supply of material and still be suitable for the job. Specification "B" was the result.

This specification, while perhaps not an outstanding example, did serve its purpose. However, a closer examination will reveal a few points which would make it a little more effective. The name of the company has not been included in the heading or title. This is an important identi-

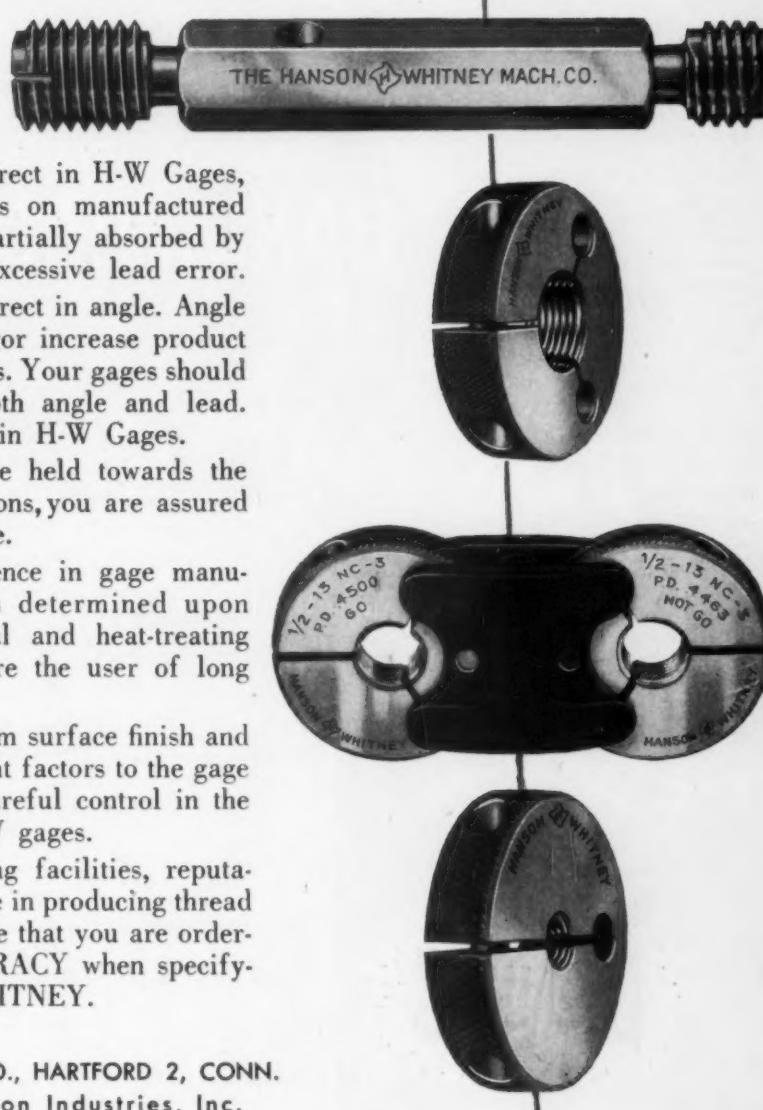
(Please turn to page 318)

CHECK THREAD DIMENSIONS OF YOUR PRODUCT WITH Hanson-Whitney GAGES

Factors to be considered when ordering Thread Gages and reasons why you should specify HANSON-WHITNEY.

- LEAD:** Thread lead is correct in H-W Gages, therefore tolerances on manufactured products are not partially absorbed by using gages with excessive lead error.
- ANGLE:** H-W Gages are correct in angle. Angle error plus lead error increase product manufacturing costs. Your gages should be checked for both angle and lead. Both are accurate in H-W Gages.
- WEAR:** As H-W Gages are held towards the high limit dimensions, you are assured maximum gage life.
- MATERIAL:** From long experience in gage manufacture, H-W has determined upon grades of material and heat-treating methods that assure the user of long gage wear.
- FINISH:** Correct and uniform surface finish and hardness—important factors to the gage user—are under careful control in the production of H-W gages.
- FINALLY:** H-W manufacturing facilities, reputation and experience in producing thread gages are insurance that you are ordering GAGE ACCURACY when specifying HANSON-WHITNEY.

HANSON-WHITNEY MACHINE CO., HARTFORD 2, CONN.
Division of Whitney-Hanson Industries, Inc.



For practical recommendations submit your problems to Hanson-Whitney engineers.

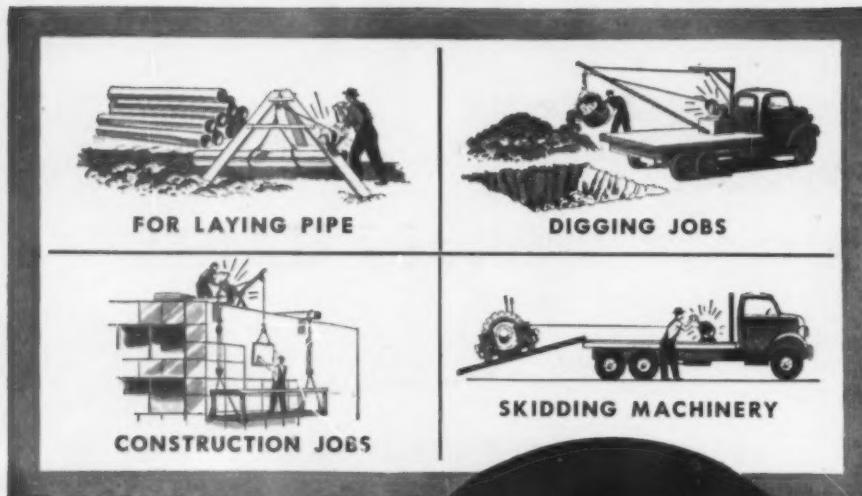
Hanson
Whitney
PIONEERS OF FINISHED TAPS

BHW48

SEPTEMBER, 1949

Want Additional Product Information? See Page 19.

317



One man lifts or pulls loads up to 10,000 lbs. with the AMERICAN HANDIWINCH. Simple, rugged, weighs only 95 lbs. Carries easily, sets up anywhere. Cut steel gears, two gear ratios. Has demountable tail yoke. Triple-width drum model also available. Sold everywhere; made by AMERICAN HOIST AND DERRICK CO., ST. PAUL 1, MINNESOTA.

ALSO MAKERS OF GENUINE CROSBY CLIPS AND AMERICAN BLOCKS AND SHEAVES.



IF IT'S A FORGING

BILLINGS

OUR HAMMERS TALK PRODUCTION! OUR FORGING ENGINEERS KNOW FORGINGS!

WRITE OUR FORGINGS DIV. Dept. SF-3
THE BILLINGS & SPENCER CO.
Hartford 1, Conn., U.S.A.

American Folding Chair No. 43

Formed steel seat and back. Triangular reinforced tubular frame; solid-steel cross braces. Dipped, baked-enamel finish. Replaceable rubber feet.



The perfect folding chair for every industrial need

Wherever employees sit down—in cafeterias, recreation rooms, assembly rooms—this is the handiest folding chair! Safe—can't tip in use. No snagging, pinching, or soiling hazards. Folds quickly, quietly. Light, compact—easy to carry and store. Easy on the budget, too. Write for complete facts.

Also with wood seat—American Folding Chair No. 44, same advantages plus five-ply urea-resin-bonded hardwood seat, durably lacquered. (And No. 47 upholstered in imitation leather.)

American Seating Company

WORLD'S LEADER IN PUBLIC SEATING

Grand Rapids 2, Michigan

Branch Offices and Distributors in Principal Cities

Sources and Uses of Specifications

(Continued from page 316)

fication since specifications, in many instances, are kept on file by the suppliers. The use to which the material will be put could be elaborated upon, since it has an important bearing on the selection of the quality of the material. Some information on the packaging, labeling, and marking of shipments is also needed.

Some of the points which make this an acceptable specification are: (1) the altering of the preliminary specification to comply with the available market. (2) the accuracy of the description of the material. Here in itself is an example of the use of standards. The material is classified by type, grade and quality as specified by the American Society for Testing Materials. These standards are contained in the "Book of ASTM Standards". Here the necessary chemical composition and the physical, chemical, and electrical qualities are listed along with the test procedures and expected results.

In many cases a manufacturer can
(Please turn to page 320)



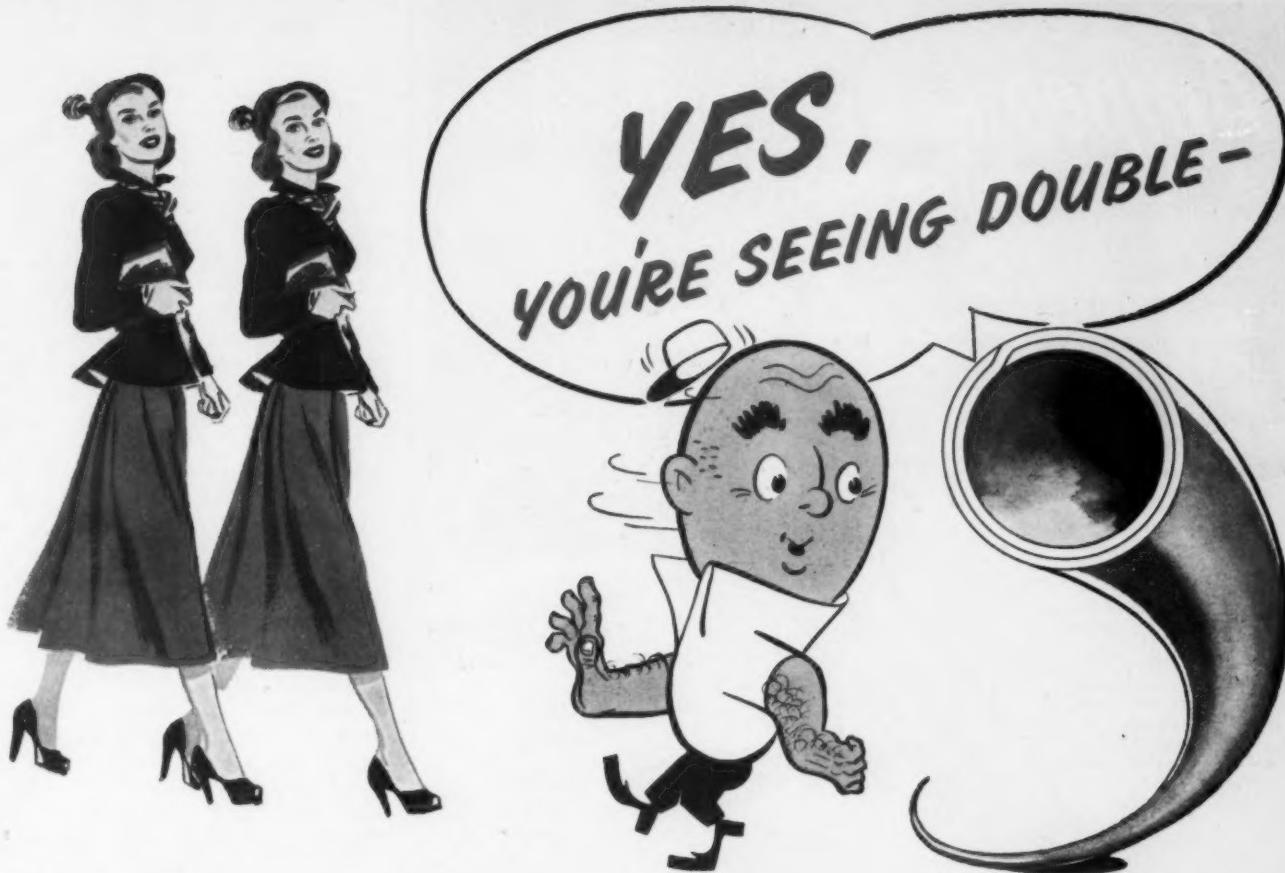
Don't ruin a valuable piece of equipment merely because some part is rusted tight. Apply Kroil, the amazing new chemical lubricant that creeps into millionth inch spaces (proved by laboratory tests), dissolves rust, supplies necessary lubrication and

LOOSENS FROZEN PARTS

5000 of America's leading plants can't be wrong! They used KROIL during the war and are still depending on it to save expensive labor and valuable parts. They say: "Kroil loosened bushings after a 12 ton press had failed" . . . on repairing heat treat trolleys formerly destroyed every nut. Now Kroil saves them all and time too" . . . You, too, should be using KROIL every day. Try it on a money back basis. Gallon \$3.50. 5 Gals, \$13.75 FOB Chicago.

Jobbers—Ask for discount schedule.

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83 E. WACKER DR., CHICAGO 1, ILL.



—and it's a good sight for your eyes, too!

For you're looking at *double-walled* Bundyweld* Tubing! In steel, Monel or nickel, it's a *double-duty, doubly* strong, *doubly* useful tubing well worth a long second glance.

Bundyweld's patented construction doubles up with the special features of nickel and Monel to offer *advantages that no other tubing can match*. It's ductile, lightweight, faster-cooling—a real miracle tubing of industry.

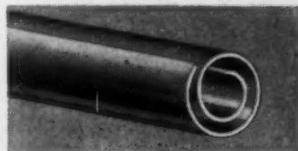
Perhaps you have a new idea where an application of extra-strong, sturdy Bundyweld may help out. We used to think there weren't any left. But designers keep on specifying it, and uses seemingly double daily.

"Oh, yeah!" you say?

Well, maybe not *that* fast, but here are a few instances to show you what we mean. Take weather-resistant, non-sagging Bundyweld for television antennas. Or leakproof Bundyweld for radiant heating. Again, ink cartridges for ball-point pens, ledger posts in accounting books—the list is as long as it is amazing.

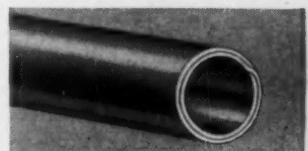
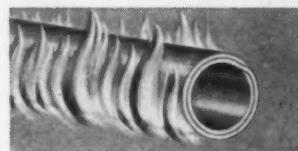
What about your new idea? Like some help on it? Or more information on Bundyweld? Just contact one of the representatives below, or write: *Bundy Tubing Company, Detroit 14, Michigan.*

WHY BUNDYWELD IS BETTER TUBING



1 Bundyweld Tubing, made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with a bonding metal.

2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.



3 Next, a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong ductile tube, free from scale, held to close dimensions.

4 Bundyweld comes in standard sizes, up to $\frac{5}{8}$ " O.D., in steel (copper or tin coated), Monel or nickel. For tubing of other sizes or metals, call or write Bundy.

BUNDY TUBING



ENGINEERED TO YOUR EXPECTATIONS

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— reduces welding and forming costs on aluminum, stainless steel, tubing, etc.

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- Inner Sleeve — Ampcoloy 97 or 95
- Shaft — Ampcoloy 95 or 97



AMPCO triples shaft life... CUTS resistance-welding COSTS

Proved by savings in maintenance and downtime — in Indiana Plant

Ampco Metal sleeves and bearings give this shaft the guts to take the heavy punishment of forming and welding in one high-pressure operation. Analyze your own jobs — see how durable Ampco products can make similar savings for you!

This combination of toughness and hardness in Ampcoweld tips and wheels resists mushrooming and wear. Their high electrical conductivity resists sticking to work. They require less dressing. That's why you can count on minimum downtime, top production — greater profits. All Ampco resistance-welding products meet R.W.M.A. specifications.



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Milwaukee 4, Wis.

West of the Rockies it's the Ampco Burbank Plant, Burbank, California

Send for detailed information on Ampco Resistance Welding
Tear out this coupon and mail today!

*Reg. U. S. Pat. Off.

Ampco Metal, Inc., Dept. P-9, Milwaukee 4, Wis. Please send me Bulletin 68B.	
Name.....	Position.....
Company.....	
Company Address.....	
City.....	(.....) State.....

Sources and Uses of Specifications

(Continued from page 318)

save time, effort and money by accepting an approved industry standard. There are many technical societies which have attempted to set up standards. The primary standardizing body in the United States is the American Standards Association. This association, organized in 1928, is comprised of 97 technical trade and Governmental organizations. It is maintained by industry as a national clearing house with 2,000 member companies. For its publications it draws from 650 technical organizations. It has established some 800 to 900 standards up to the present time.

The American Standards Association is, by no means, the only organization setting up standards. The A.S.A. covers the entire industrial field and is quite selective in establishing standards. However, virtually every field of endeavor has an organization which attempts to set standards in its products. A few of these are The American Society for Testing Materials, The American Society of Mechanical Engineers, The Society of Automotive Engineers, The Underwriters Laboratories, The American Institute of Mining and Metallurgical Engineers, and many others.

In addition to these, we have another source in the Governmental agencies. The National Bureau of Standards cooperates with the independent societies closely, but also acts on its own in setting up standards. The Corps of Engineers in the Army Department sets up its own standards as does the Navy Department.

Experience has proved that standard items are more economical and have faster deliveries than do special items. Many times, however, due to the nature of its utility, a special item must be ordered. In securing bids from the various suppliers, a buyer must be sure that the suppliers are quoting on exactly the same materials. The more complete his specifications are, the more certain he is that his suppliers are quoting on the same product.

TELL YOUR FELLOW-PURCHASING AGENTS ABOUT WHAT YOUR COMPANY HAS TO OFFER—AS WELL AS YOUR NEEDS — THROUGH CLASSIFIED SECTION OF PURCHASING SEE PAGE 334



KEEPS OUT DESTRUCTIVE DUST, RETAINS LUBRICANTS

Today, thanks to felt, farm tractors can plow and harrow in thick clouds of dust without damage. It was not always so; some of the early farm tractors were failures because their working parts were not adequately protected, and dust chewed up the engine, the bearings, the brakes.

Tractor manufacturers now have dust well under control, and American Felt Company is proud to help them, supplying felt for shields and seals that not only keep dust out of working parts, but also retain lubricants. Thus felt serves both industry and agriculture in several important ways. If your product requires protection against dust, dirt, water, or other substances, and must be reliably lubricated, write American Felt Company. Ask for Data Sheet No. 11, "Felt Seals, Their Design and Application", which gives authoritative technical information and includes illustrative samples.

American Felt Company



General Offices: 44 Glenville Road, Glenville, Conn.

ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.—PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.—SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal

VERSATILITY: Plain felt seals are cut by American Felt to your order, with a dimensional tolerance of .005". Laminated felt seals consist of plain felt combined with one or more impervious septums of Hycar. Various combinations are possible, so that a single washer can combine lubrication, lubricant-retention, and sealing against dust, water, etc.



"PEL-X is BEST by TEST!"

Recently, one of our customers sent us, *unsolicited*, the findings on a test he conducted. In this experiment, PEL-X was tested along with seven similar tracing cloths and when the results were in, PEL-X topped the list on every count including evenness of pencil lines and workability — and by a substantial margin, too!

This is proof that PEL-X can do everything as well as any other tracing cloth and some things better.

Find out for yourself just how good PEL-X really is by trying it on your drawing board. Put it to any test against any competitive tracing cloth and compare the results. We're sure you'll want to switch to PEL-X. Write for generous sample. *Name on request.

THE HOLLISTON MILLS, INC.
NORWOOD, MASS.

NEW YORK PHILADELPHIA CHICAGO

★ PEL-X is backed by Holliston's 50 years of leadership and experience in developing special purpose cloths for industry.



"What's so good about H-VW-M CLEANERS?"

THOMAS M. RODGERS
H-VW-M Field Representative
Philadelphia Office

"Now there's a man who wants facts," I thought, when a customer popped that question at me. It so happens that of all the H-VW-M items of electroplating and polishing equipment I handle, the "cleaners story" is one of my favorite subjects:

"As we both know," I started, "absolutely clean metallic surfaces are a prerequisite for successful electroplating and anodizing. Poor adhesion, porosity, blisters and other faults in final finishes can usually be traced to inadequate cleaning. In addition, you've got to consider such factors as attack on metals, emulsifying power, electrical conductivity, chemical stability and service life of the cleaning agent."

"No one cleaner can do all jobs equally well," I hastened to point out, "and that is where H-VW-M's long years of experience in solving metal cleaning problems come in. Before recommending a cleaner we analyze pre-cleaning, cleaning and plating operation . . . consider type of materials to be removed after buffing and polishing . . . surface conditions . . . packing in recesses . . . effect of stacking. We also check base metal being used . . . whether D.C. or R.C. is required and whether cleaning operations passivate or activate."

For full information on our cleaners, you'll always find a H-VW-M representative ready to recommend the right cleaner for the job . . . or you can write direct to "Headquarters" for Bulletin C-105.

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

Manufacturers of

a complete line of electroplating and polishing equipment and supplies.

Plants: Matawan, New Jersey • Anderson, Indiana

Sales Offices: Anderson • Chicago • Cleveland • Dayton • Detroit
Grand Rapids • Matawan • Milwaukee • New Haven • New York • Philadelphia
Pittsburgh • Rochester • Springfield (Mass.) • Stratford (Conn.) • Utica



*Hanson-Van Winkle-Munning has supplied the plating industry for over 70 years. Our sales-engineers are thoroughly familiar with every step in the process of electroplating and polishing. It is this overall knowledge that has made H-VW-M "Headquarters" for electroplating and polishing equipment, supplies and technical assistance.



5861

Fungus Fighters

(Continued from page 122)

sticky or poisonous as some other rot-proofing treatments do.

The partial acetylation processes already are finding commercial use. Cotton bags treated this way are now being manufactured for water-softening systems, where they hold softeners in tanks of circulating water. Under several conditions untreated bags rot and go to pieces in a month or less, but those from partially acetylated cloth remain in good condition for more than a year.

Fish nets and shoe lining cloth of partially acetylated cotton are now being tested commercially. Other promising uses include tents, awnings, tarpaulins, seed-bed covers and other outdoor fabrics.

Meanwhile, sportsmen, homeowners, and others are already benefiting from wartime processes developed to protect equipment in tropic climates. Mildew-resistant shower curtains are on the market. More durable camping equipment, fishing nets and hawsers, and longer-lasting inclement-weather clothing are available.

Our foreign trade is a beneficiary of fungus research. A large volume of American exports goes into Central and South American areas where long rainy seasons and intense humidity and heat make life a constant battle against mildew and rot. Having products to withstand these conditions will be good for American manufacturers and indirectly for all Americans.

◆ ◆ ◆

Partners in Production

(Continued from page 134)

tion among all groups in our economic life. We are keenly aware of the importance of that question but we have not as yet found the solution. There can be no doubt that men work best together when the goals for which they strive are compatible and when their energies and initiative are not wasted in perpetual conflict. But there must be mutual respect and confidence before any area of agreement can be explored.

Here again the threat of complete annihilation by atomic weapons may prove a powerful incentive toward lessening the area of combat between labor and management. Any step in that direction will indicate progress and will prove of inestimable benefit to all.

Our impressive industrial potential
(Please turn to page 324)

*Castellated Nuts
Replaced—*

**ELASTIC STOP NUTS
SAVE PRODUCTION TIME... MONEY**



**The Red Elastic Collar Keeps
Production Costs DOWN... Production UP!**

On the engine rear support bolts of the Sterling Heavy-Duty Diesel Trucks, Elastic Stop Nuts have replaced castel nuts and speeded up production in a typical example of assembly line fastener simplification.

Sterling found that Elastic Stop Nuts provided the necessary positive fastening security at lower cost. Why? Because Elastic Stop Nuts lock in position anywhere on a bolt or stud—and only ONE adjustment is necessary—the first. The self-locking, self-sealing Red Elastic Collar provided the "grip-dependability" Sterling needed to keep their precise

settings permanent. No amount of vibration, impact or heavy field duty can shake Elastic Stop Nuts loose.

And all Elastic Stop Nuts keep bolt and nut threads rust-free... seal against liquid seepage along bolt threads... do not damage the threads... and are reusable.

HERE'S A CHALLENGE: Send us complete details of your toughest bolted trouble spot. We'll supply test nuts—FREE, in experimental quantities. Write: Elastic

Stop Nut Corporation of America, Union, N. J. Representatives and Agents are located in many principal cities.



**THE FAMOUS RED ELASTIC COLLAR
IS VISIBLE EVIDENCE OF
LOCKING SECURITY**

Threadless and permanently elastic, it provides these 4 outstanding features:

1. Protects against nuts loosening due to VIBRATION
2. Keeps locking threads CORROSION FREE
3. Provides for accurate BOLT LOADING
4. Seals against LIQUID LEAKAGE along the bolt threads

ELASTIC STOP NUTS



HIGH
TENSILE



ANCHOR



WING



SPLINE



CLINCH

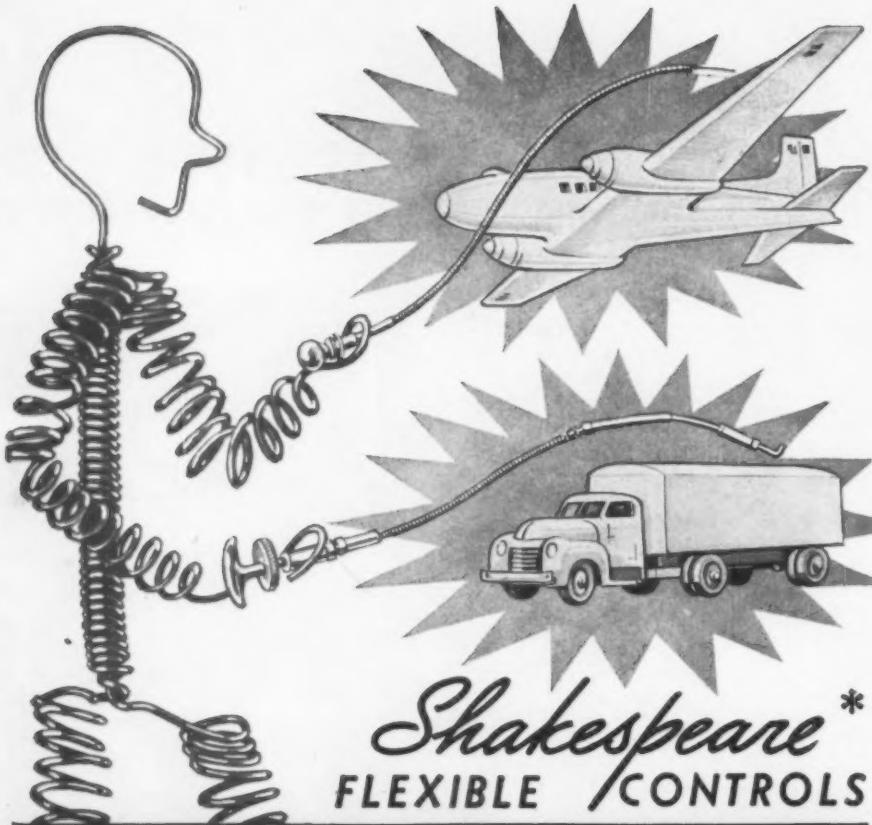


GANG
CHANNEL

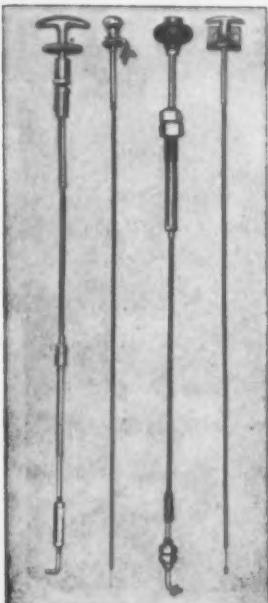


NYLON
CAP

OVER 450 TYPES AND SIZES IMMEDIATELY AVAILABLE FROM STOCK



*Shakespeare**
FLEXIBLE CONTROLS
made with
KEYSTONE WIRE



Shakespeare flexible control cables for trucks and aircraft give sure dependability . . . sturdy efficiency through smooth, positive operation.

Because these control cables are "life-lines" between operator and motor, the types of wire used in their construction must meet rigid specification . . . conform to extremely close tolerances. Several types of Keystone wire are used . . . galvanized basic; drawn-after-galvanizing MB; brite MB and coppered MB. Each type of Keystone wire delivers in full the exact uniformity of strength, gauge and analysis required.

Regardless of the performance demanded in your wire products, consult Keystone for the materials to meet your most exacting specifications.

*Shakespeare Products Company
241 E. Kalamazoo Avenue
Kalamazoo 2, Michigan

SPECIAL ANALYSIS WIRE
for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS



Partners in Production

(Continued from page 322)

tial staggers the imagination. But keeping it running in high gear will depend largely upon the ability of the men who run it to get along with one another. Unless the tensions of strong and mutually hostile groups are eased, our glorious machines of abundance will slowly grind to a halt.

We have more than our own enlightened self interest at stake here. The hopes of men and women everywhere on the earth are centered in it.

The defensive warfare in which both labor and management have engaged in the past two decades has tended to make both look upon every concession as a potential break-through. Much of Labor looks upon its Unions as symbols of security. It believes, with some justification, that it has attained its present economic status as much through winning the battles of the Unions against employers as through the operation of the free enterprise system and its own hard work. Much of Management feels that there is no end to Union demands, except possibly the final destruction of the whole system. Management therefore has been constantly seeking the containment of the unions.

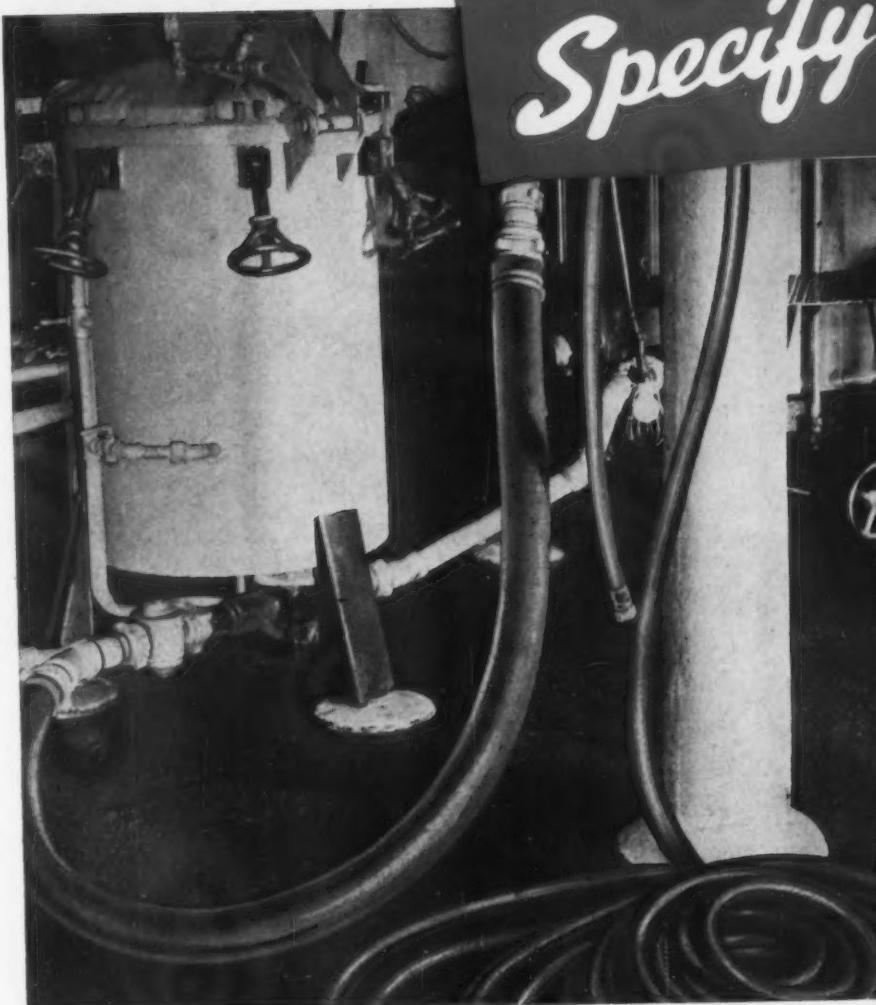
Opposing Groups Together

Such a picture would be a dismal one indeed if there were not clear evidence that collective bargaining and sensible negotiation are actually working. The two once opposing groups of labor and management are being drawn together in industry after industry throughout the nation.

"In any situation involving human beings it appears easier to argue persuasively that conflict will break out than that peace will reign. In the early days of our history it seemed inevitable to many that this great democratic experiment would sooner or later fly apart. It did once, but the rewards of unity proved in the long run to be more enticing. Now, eighty years later, the United States of America is perhaps the greatest example of man's ability to live and work harmoniously with millions of his fellows."

In a chapter entitled "Goals and Attitudes" there is spelled out a philosophy of cooperation that, if adopted and extended, even gradually, will lead this nation to an era of production and prosperity

(Please turn to page 326)



Specify Thermoid



The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasive action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

Versicon Hose Cuts Costs

Now available . . . a multi-purpose hose designed for superior performance with virtually any liquid or gas . . . Thermoid Versicon Hose. It is made with neoprene tube and oil-resistant cover—with high tensile rayon cords to insure maximum strength, light-weight and flexibility.

Versicon, another of the famous quality rubber products made available to industry through Thermoid research, is the answer to a long felt need. Now your nearest Thermoid distributors can supply you with *one hose* for your requirements. Now you can cut your costs and reduce inventory. Versicon eliminates the need for special hose . . . Versicon is the special hose. Available from $\frac{3}{16}$ " to $2\frac{1}{2}$ " for use with air, water, oil, gases and virtually all fluids in lengths from 50' to 500' depending on size.

It will pay you to **Specify Thermoid!**

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

**Thermoid
Company**

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U.S.A.
Industrial Rubber Products • Friction Materials • Oil Field Products



with D. A. STUART CUTTING FLUIDS

THERE are several reasons why it pays to give more than ordinary attention to selection of cutting fluids. Experience has shown that such attention can, more often than not, achieve these results:

1. Longer Tool Life.
2. Better Finish.
3. Greater Output per Machine.
4. Less Scrap Loss.
5. Reduction in Number of Different Oils and Blends Required.

These benefits add up to Lower Operating Costs.

D. A. Stuart Oil Co. is prepared to help you stretch your machining dollar by the soundly engineered application of superior cutting fluids. Ask to have your nearby D. A. Stuart Oil Co. representative call to prove this statement. Send for D. A. Stuart literature.

"WISE ECONOMY RESULTS FROM WISE SELECTION OF CUTTING FLUIDS"

STUART service goes with every barrel

D. A. Stuart Oil CO.
2727-31 South Troy Street, Chicago 23, Ill.

Partners in Production

(Continued from page 324)

that no country on earth can equal or even approach.

In this book, questions about guaranteed annual wages, incentive plans, employee participation in policy making, seniority, and kindred problems are fully explored and reasoned observations are skillfully presented.

In the conclusion of the book, where analysis and recommendations are outlined, there is a labor-management program fitted to every industrial undertaking and to every worker.

"Partners in Production" fully justifies its sub-title—"A Basis for Labor-Management Understanding". It is indeed a basis for understanding presented forthrightly and often with brilliance.

Purchasing and all other business men will find it highly profitable reading.

1 1 1

Not-so-well Known Facts About Pipe and Fittings

(Continued from page 96)

used in high temperature or high pressure service, for besides its lower initial strength it is weakened by high temperatures. For example, it is only 85% as strong at 360 degrees F as at ordinary temperatures.

According to the Bureau of Standards, charcoal iron expands 0.000006861 inches per degree F, and Bessemer steel 0.000006989 inches. In steam pipe lines exposed to the weather, however, the expansion is seldom as great as this theoretical figure on account of the lower outside temperature. Consequently one is safe in using the slightly smaller and more easily remembered coefficient 0.0000067.

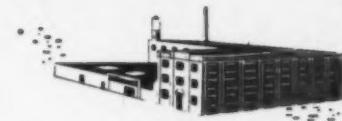
To compute the expansion of any given iron or steel pipe of known length, use the formula:

$$E = 0.0000067 \times T \times L$$

where E is the expansion (in inches), T is the difference in temperature before and after expansion (in degrees F), and L is the length of the pipe (in inches).

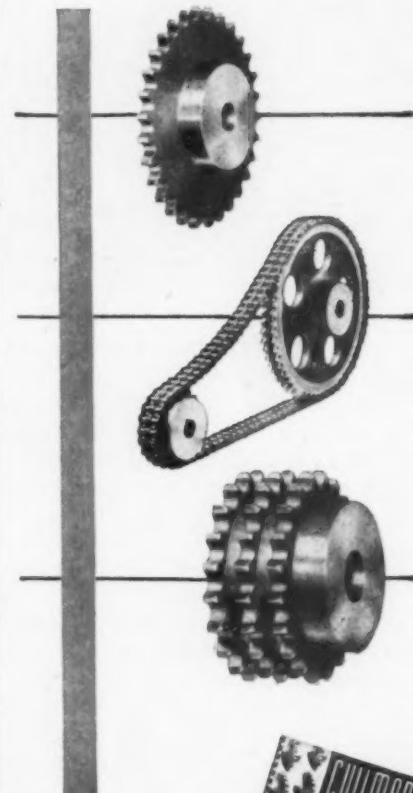
It is easy to remember the figure 0.0000067. There are 5 ciphers, and then come the numbers 6 and 7 in sequence, namely—"567". Thus if you remember that there are 5 ciphers, you remember the number. That trick was pointed out to the writer many years ago, and he has never had any difficulty in remembering it.

CULLMAN Sprockets



Over 80,000 Sprockets and 80,000 feet of Chain Now in Stock

More than half a century of specialization in the design and manufacture of sprockets has made Cullman a leader in the sprocket field. Today, Cullman can ship promptly from its stock of over 80,000 sprockets, of endless types and dimensions. Too, sprockets for special requirements can be quickly produced at low cost due to Cullman's long years of experience and high precision production methods.



Helpful Cullman Catalog
gives engineering data full information on sprockets and chains carried in stock



193-5
CULLMAN WHEEL COMPANY

1352P Allgood St.

Chicago 14, Illinois



**Every sparkle means a farmer's saving money
You see them everywhere . . . farm roofs of Alcoa Aluminum
Because ALUMINUM LASTS**

Wherever autumn highways take you, you'll see sun bouncing off a better kind of farm roof. It's Alcoa Roofing Sheet. It's light, easy to put on. Keeps buildings cooler inside. Best of all, it lasts.

It's successful because of a kind of partnership. Between American farmers, who see a bargain in a roof that lasts . . . and Alcoa, who spent years to make it possible.

In those years we brought the price of aluminum down to where an Alcoa Aluminum roof

would fit a farmer's budget. Developed corrosion-resistant alloys that never need painting. Pioneered the kind of nails needed to put the roofing on. Tested finished roofs in all kinds of weather.

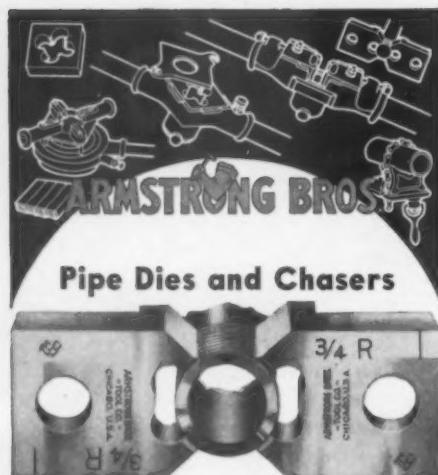
That kind of work enables us to say "Alcoa Aluminum lasts!" . . . and back it up. It makes things of Alcoa Aluminum worth buying.

ALUMINUM COMPANY OF AMERICA, 1908J Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in principal cities.

ALCOA

**FIRST IN ALUMINUM
THE METAL THAT LASTS**

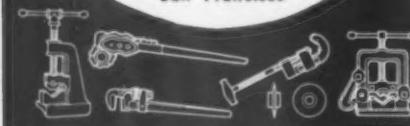




Cut smooth close-fitting threads—cut quickly, easily and back-off pipe without jamming. They hold their free-cutting characteristics because: they are machined from alloy cutting steel; are hardened oil-tempered, drawn and tested, have hob-cut "backed-off" teeth with ground points and carefully computed cutting angles.

"Adjustable" and "Solid" type dies in sets for all standard stocks and chasers for standard threader. Stocked by Leading Tool Departments. Write for New S-48 Catalog just released.

ARMSTRONG BROS. TOOL CO.
5203 W. Armstrong Ave.
Chicago 30, U. S. A.
New York
and
San Francisco



Using the Customer As A Supply Line

(Continued from page 109)

adelphia, Houston, Denver, and Minneapolis.

A Catholic school priest secured 22,400 pounds by working on his parishioners when the school needed lockers.

A paint spraying company came through with 314,000 pounds for much needed steel shelving.

One man wrote: "I read your advertising and I have steel. What I want is an automobile." Lyon couldn't make the automobile, but within 24 hours an alert salesman had located a Chevrolet dealer who needed parts bins. The man got his car, the dealer got his bins, and Lyon got the steel.

"We are gratified by the results of the program for two reasons," says H. B. Spackman, Executive Vice President and General Sales Manager. "Not only did it enable us to keep a high level of production and employment, but it provided quick delivery or urgently needed equipment for thousands of our customers who otherwise would have been faced with an indefinite stay on the waiting list."

STABLE GRAPHITE FILM DEVELOPED

A highly successful means of applying a stable graphite film to practically any surface has been developed after 10 years of research by the Electrofilm Corp., 7116 Laurel Canyon Boulevard, North Hollywood, Calif.

The new stable graphite film, as applied by the process, is extremely thin (0.00015 to 0.0005 in.) but has excellent resistance to abrasion and exceptional bearing strength. The adhesion to the intended surface is high, and on metal and most other surfaces sufficient diffusion of the graphite into the surface is obtained to insure presence of a graphite surface even when the external coating is apparently removed.

The graphite is applied by spray or dip, following normal surface preparation and has been successfully used on metal, plastics, rubber and ceramics. For most purposes, no plating is required, although Electrofilm graphite can be applied over plated parts.

The film is stable, and provides the intended surface characteristics over temperatures ranging from -120°F. up and some variations have been tested satisfactorily to 2000°F. The graphite film is unaffected by exposure to solvents and weather.

The cost of applying the graphite is said to be inexpensive, and the process is licensed to manufacturers or can be applied by the Electrofilm Corp.

How much profit in a lost customer?



"There goes Mr. Jones . . . not the type to throw money around . . . hope he'll be satisfied with that 'just-as-good' Can!" Yes, the dealer made the sale—but perhaps he has lost a valued customer. Just as you base your service on satisfied customers, so do the makers of WITT Cans and the dealers who supply you. That's why you are never sold a "just-as-good" Can which may, in time, short-change you on service, create dissatisfaction. Compare a WITT Can with the ordinary Can. From the top, one-piece with a firmly attached handle, to the bottom, raised from the ground, curved for extra strength and sealed with "cover-all" hand-dipped galvanizing, WITT Cans are a picture of extra strength and extra value. The tough body of heavy gauge steel is strengthened with steel bands. These features make possible the famous guarantee . . . "WITT Cans outlast ordinary Cans, three to five times." They are also responsible for the preference expressed by leading industries which find WITT Cans cost less for each year of service—because they last years longer.



STRAIGHT SIDES Provide
Rugged Strength . . . Greater
Resistance to Rough Han-
dling . . . Longer Wear!

Witt Cans

THE WITT CORNICE COMPANY
CINCINNATI 14, OHIO
"Originators of the Corrugated Can"

For wiping and polishing



Kimwipes* new industrial tissues

At last! A new, efficient cleaning material for a myriad of special wiping uses. Soft, fresh KIMWIPES* industrial wiping tissues. Easy to handle—quickly disposable. KIMWIPES remove the smallest shavings around machined parts without scratching. Recommended for use on all highly finished surfaces. So absorbent, they blot up 16 times their own weight in liquids.

With KIMWIPES, you can use a clean sheet for each operation. They're safer because when you throw away the used tissue, all grit and foreign matter are disposed of. Useful in machine shops, packing rooms—almost any type of business. For full details and the name of the KIMWIPES distributor nearest you, write us on your letterhead. Kimberly-Clark Corporation, Creped Wadding Division, Neenah, Wisconsin, U.S.A.

Automatic
serve-up
packages



INDUSTRIAL WIPING TISSUES

*T. M. REG. U. S. AND CAN. PAT. OFF.

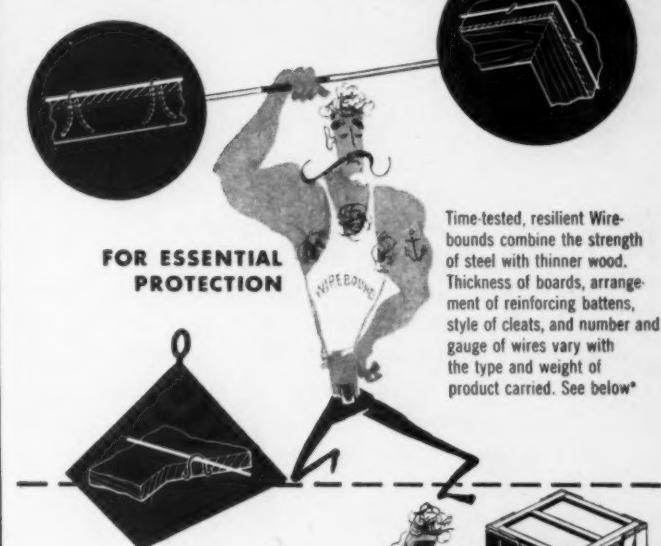


Kimwipes*



FOR FASTER ASSEMBLY

Wirebound Boxes and Crates come to you as flat mat units, $\frac{1}{2}$ assembled. Most sizes are ready to pack in less than a minute. Wrap-around crate illustrated is typical of Wirebound time and labor saving designs. See below*



FOR ESSENTIAL PROTECTION

Time-tested, resilient Wirebounds combine the strength of steel with thinner wood. Thickness of boards, arrangement of reinforcing battens, style of cleats, and number and gauge of wires vary with the type and weight of product carried. See below*



FOR LOWER COSTS

A typical user reports
Wirebounds reduce tare weight
33%, provide over-all shipping
room savings of 25%, slash
storage requirements 80%, cut
assembly and packing time 50%.
Wirebounds will deliver your
goods safely and at lower cost.*



USE

60 Wirebound Plants
throughout the United States

Wirebound
BOXES & CRATES
FOR LOWER TOTAL SHIPPING COSTS

*Send for free book... contains complete details of Wirebound advantages, technical features and describes how Wirebounds are designed specifically to meet your requirements. Mail coupon today!

Wirebound Box Manufacturers Assn., Room 1821, Berland Bldg., Chicago 3, Ill.

Send Booklet of Product Information Send a Sales Engineer

NAME _____	ADDRESS _____
COMPANY _____	ZONE _____ STATE _____
CITY _____	_____

OUR PRODUCT IS



Lower spring costs often can be achieved by several different means. You can buy them in huge quantities; you can compromise on springs of inferior quality; you can order from an inexperienced source, etc.—but there is a more satisfactory way that has enabled hundreds of manufacturers to save thousands of spring dollars.

The secret is in the engineering and application of the most practical springs for the purpose at the most practical price. It is surprising how many manufacturers are using "fancy" springs that don't contribute any more to product efficiency than a less expensive, more practical spring. Lewis Spring Engineers, with many years' experience in the design, manufacture and application of springs of all types, take pride in helping you save by recommending the right springs for the right price.

There is a Lewis Spring Engineer near you who will be glad to discuss your requirements without obligation. Call or write us today.

LEWIS SPRING & MFG. CO.
2648 North Avenue, Chicago 47, Illinois

Lewis
PRECISION

SPRINGS

THE FINEST LIGHT SPRINGS AND WIREFORMS
OF EVERY TYPE AND MATERIAL

TOUGH FASTENING JOB?



(Illustrated)
Model 121
Chicago Automatic
Rivet-Setter

CHICAGO RIVET & MACHINE CO.
9607 W. Jackson Blvd., Bellwood, Ill. (Chicago Suburb)

Automatic Rivet-Setters • Tubular and Split Rivets in all Rivet Metals

SHEET METAL WORK

Let us help lower your manufacturing costs . . .

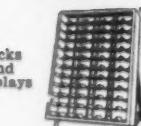
Metal fabricator of wide experience has complete, modern facilities available for shearing — forming — drawing — welding and painting sheet steel and aluminum products or parts up to $\frac{1}{4}$ " thick.

250 experienced employees will give personal and careful attention to your orders. Materials now available — prices reasonable. Prompt service and quick deliveries.

Mail blue prints, specifications or samples for quotations on any quantities. Write or phone us for Sales Engineer to call.



Metal Cabinets



Racks and Displays



Metal Lockers and Drawers

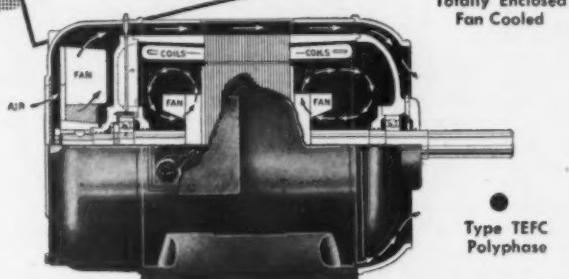


Metal Furniture

DURABILT MFG. CO.

663 ARNOLD AVE.
AURORA, ILLINOIS

THE LATEST DEVELOPMENT
in AIR COOLED
Ball Bearing
MOTORS



Totally Enclosed
Fan Cooled

Type TEFC
Polyphase

Here is the newest and most successful development in air cooled motors. Totally enclosed, constant speed, continuous duty; it is designed for cooler and more economical operation under the hardships of extreme heat and dust. Fully ball bearing and quiet running, too. You will want to know more about this new VALLEY Motor.

WRITE FOR DESCRIPTIVE LITERATURE

VALLEY ELECTRIC CORPORATION

4221 Forest Park Blvd. • St. Louis 8, Mo.

HODELL BULLDOG COIL

The Chain of a Thousand Uses

Because it is strong, light, flexible and low in cost, Hodell Bulldog Coil Chain has a wide variety of uses in industry.

Size for size, Bulldog Coil Chain has an amazingly low weight in proportion to its load-carrying ability and resistance to wear.

Available in 15 sizes to meet every need. Write for full information.

Established 1886

HODELL CHAIN COMPANY
3924 COOPER • CLEVELAND 3, O.
DIV. of THE NATIONAL SCREW & MFG. CO.

Mack
LET FIGURE IT IN PLASTICS—



Gauge Case
Molded for the
Ashcroft Long-
Life Duregauge
with the
Revolutionary
Nylon
Movement*
(*Pat. Applied
For)



Write today on your company letterhead, for 12 page
Booklet D which describes complete Mack facilities.

**3 plants completely
equipped to serve you!**

- WAYNE, NEW JERSEY
- ARLINGTON, VERMONT
- WATERLOO, P.Q., CANADA



DESIGN



MOLD MAKING



MOLDING

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LETTERS . . .

SALESMEN'S SHORTCOMINGS

In analyzing our course in Sales Management, and in our attempts to keep it in line with the best current practice, we feel that we do not have as much realistic material illustrative of good practice in supervising outside salesmen, as we might desire. Therefore, I am writing a doctoral dissertation on the subject.

It just occurred to me that you might have some material that would be helpful to me.

For example, could you tell me from the purchasing agent's standpoint, what are the biggest shortcomings in salesmen? I believe, these weaknesses would indicate certain areas that sales managers and supervisors should work on in their handling of their salesmen.

Any other material that you feel would be helpful to me in my project would be greatly appreciated. I am trying to cover such points as selection procedures and devices for selecting sales supervisors, training sales supervisors, standards of performance for both salesmen and sales supervisors, and the cost evaluation of a good supervisory program.

Thank you for your time and contribution to a better understanding of the supervision of outside salesmen.

C. Leon Lapp, Sales Management Staff
The Ohio State University
Columbus 10, Ohio.

A copy of the widely circulated Purchasing Opinion survey on "Is Today's Salesmanship Equal to the Job" (PURCHASING, August 1948), containing specific recommendations of purchasing agents for improving the quality of salesmen calling on them, has been sent you. Also sent were "Better Industrial Selling" (PURCHASING, October 1948) a more extended analysis of the results of the survey, and "The Purchasing-Sales Relationship" (PURCHASING, May 1949), a report of a joint discussion by the National Sales Executives of Buffalo and the Purchasing Agents' Association of that city, inspired by the survey. — Ed.

PURCHASING-SALES RELATIONSHIP

We would like to reprint in our interval sales organ, "Sales Promoter," a few excerpts from the article, "The Purchasing-Sales Relationship," in the May 1949 issue of PURCHASING, pages 131-35. May we?

C. D. Pease, Apparatus News Bureau,
General Electric Co., Schenectady, N. Y.
Certainly.—Ed.

TIRED, TATTERED

Mr. Fritz has asked me to write for another copy of the June issue of PURCHASING. As it happens, numerous technical men have requested our copy of the magazine and have torn out the articles which they were particularly interested in. Our department, therefore, is left with a somewhat "tired" issue.

If it is possible, I should certainly appreciate your sending the magazine to Mr. Fritz.

Joan A. Folwell, Advertising Dept.
Sun Oil Co.,
Philadelphia 3, Pa.

P.A.'S AS ADMINISTRATORS

The article in your April issue by Don Hogg entitled, "The Purchasing Agent as Administrator," appeals to me as particularly applicable to the greater purchasing responsibilities emphasized today in most purchasing literature.

I wonder if most of us haven't been too buried under the routine and technique of operations to see the broader administrative concept. Certainly, we must think and plan as administrators if we wish to be executives and not buyers.

I imagine most of your subscribers retain the back issues of PURCHASING for reference, and strongly urge any who missed it to dig up and read—or reread, more carefully and more thoughtfully—Hogg's excellent editorial, "The Purchasing Agent as Administrator" starting on Page 117 of the April, 1949, issue.

James M. Berry, Asst. P. A.,
Vick Chemical Co.,
Greensboro, N. C.

BOUQUET

I would like to congratulate you and members of your organization for the excellent job you did of presenting our Mr. C. A. Maynard's article, "Pertinent Facts About Permanent Magnets," in your July issue.

We have had many good reports, all of which testify to the quality of the readership of your magazine.

Ivan A. Dickey,
Advertising & Sales Promotion Manager
The Indiana Steel Products Co.,
Valparaiso, Ind.

VALE; HAIL

When your publication was started, the writer began what has been a most enjoyable experience in reporting to you the activities of the Springfield Purchasing Agents Association. Over a period of years this has been a most enjoyable responsibility.

The new official family of our Association have felt that this duty and responsibility should be handled by someone else; this will relieve the writer of this responsibility, and I certainly want to take this opportunity to thank you for the many courtesies extended, and the consideration given over a period of years.

This job should have been taken over by somebody else a long time ago; it isn't fair to anyone to continue these responsibilities. While I am very happy about it; nevertheless, I shall miss the opportunity of writing you occasionally, as it has become somewhat of a habit.

This responsibility will be taken over by Jim Henson, of the Mad River Supply Co. You will find him a fine chap, and it is hoped that he will enjoy working with you as much as the writer in the past.

B. F. Downey, Secretary-Treasurer
The Yost Superior Co.,
Springfield, Ohio

BACKPATS

I consider PURCHASING an excellent periodical. After a thorough survey, page by page, the magazine is noted for items of interest for my buyers and Supt. of Stores and the book is forwarded to both groups with instructions to note and return.

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The service you render is excellent and in addition to the advertising your articles are genuinely appreciated.

J. M. Turner, P. A.,
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Skilsaw, Inc.
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The Bearings Co. of America,
Lancaster, Pa.

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Westinghouse Electric Corp.,
Sunnyvale, Calif.

The writer gets a great deal of usage from PURCHASING.

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FREE LITERATURE SECTION VALUABLE

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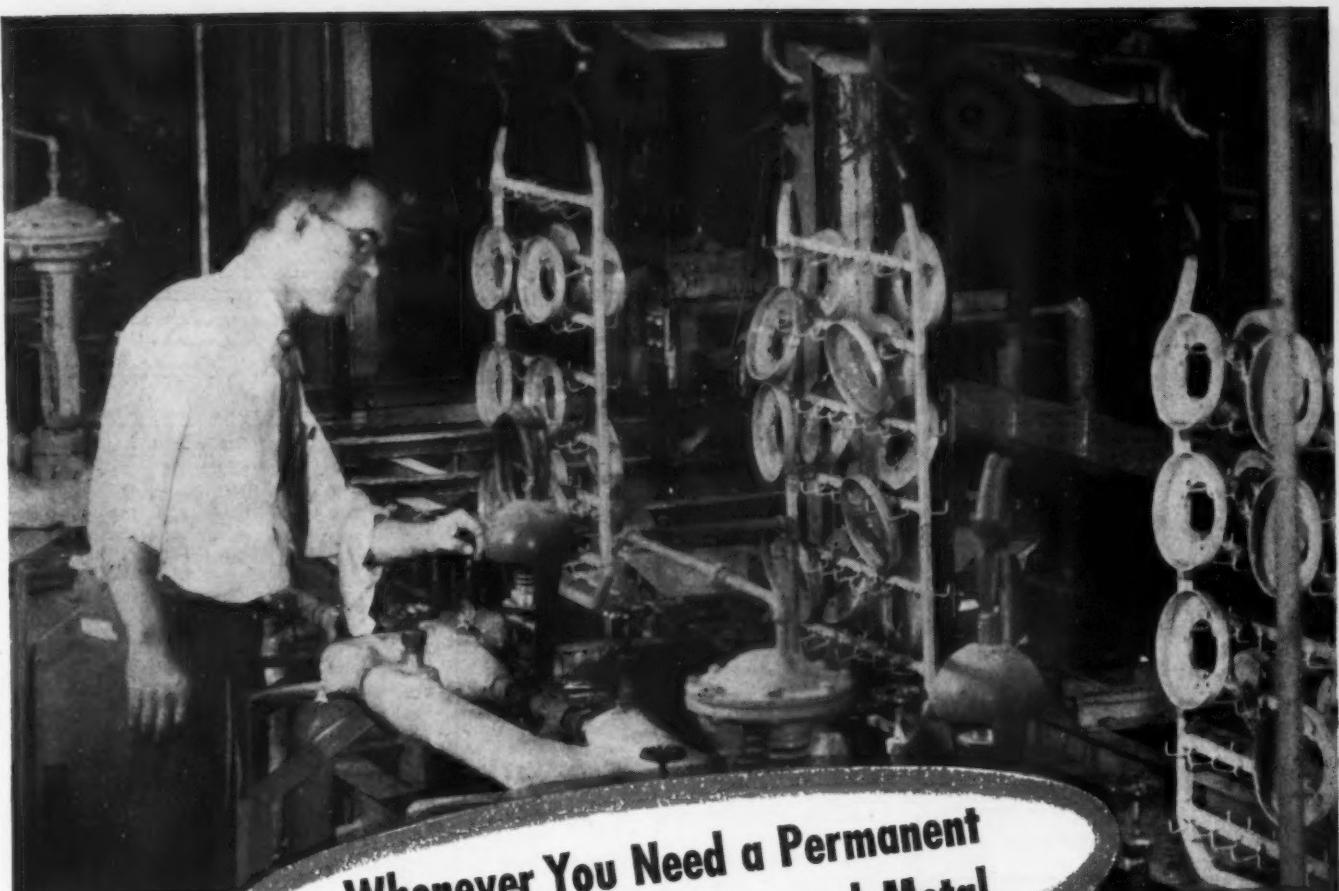
Jack Loveland, P. A.,
Reda Pump Co.,
Bartlesville, Okla.

Very good information can be obtained by using PURCHASING'S Free Literature Section.

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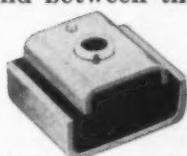
Robert I. Stuart, P. A.,
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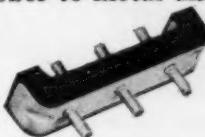
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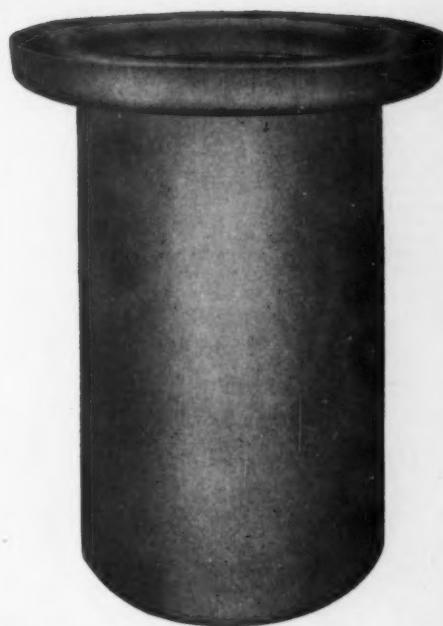
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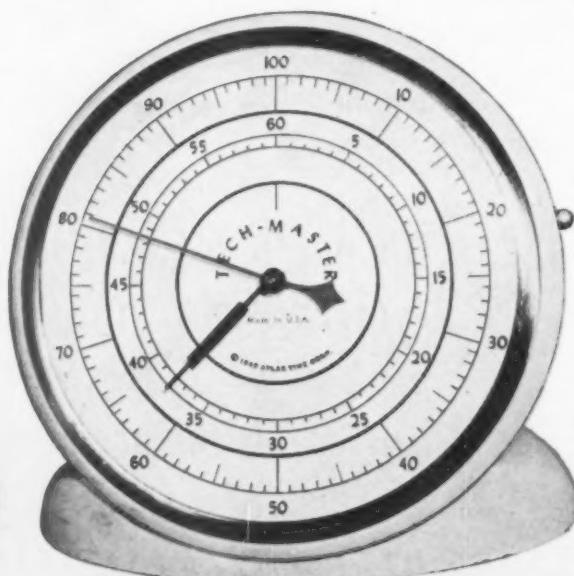
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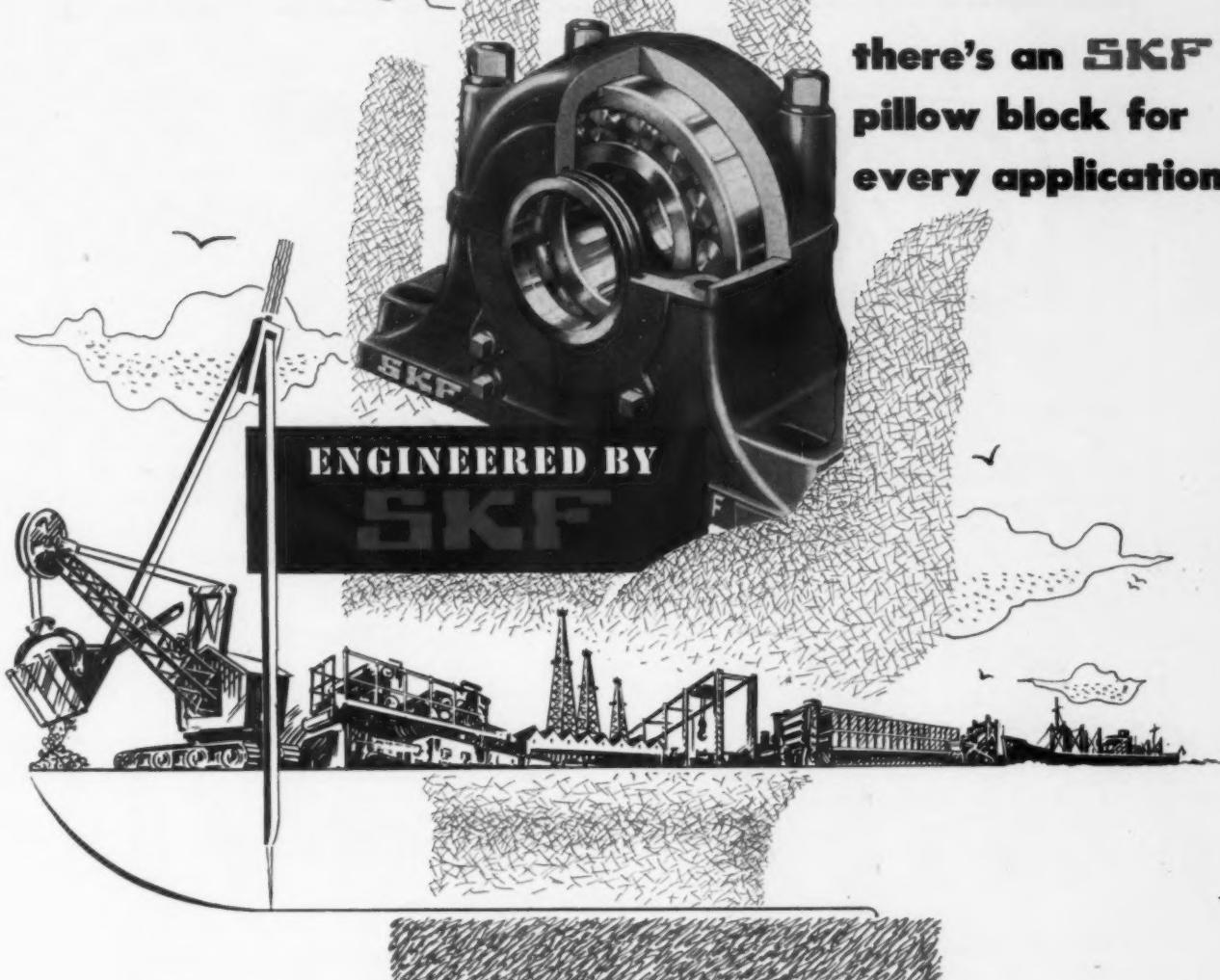
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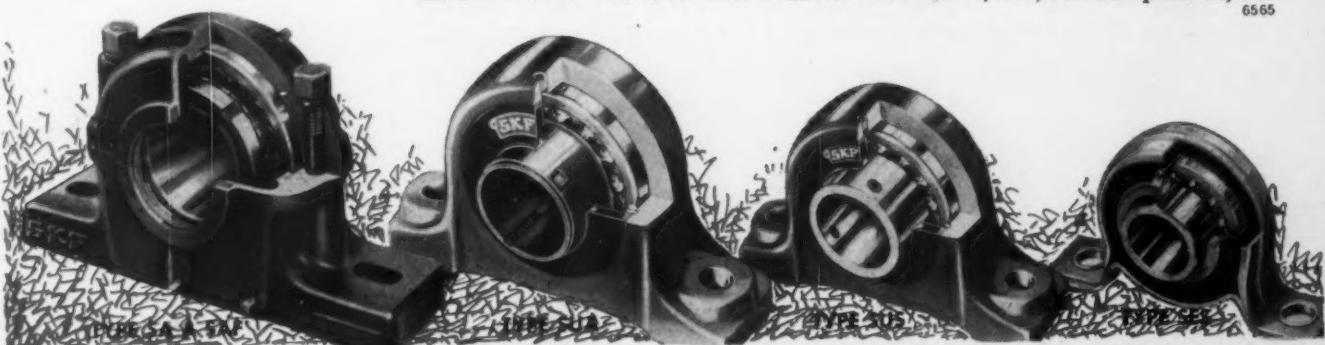


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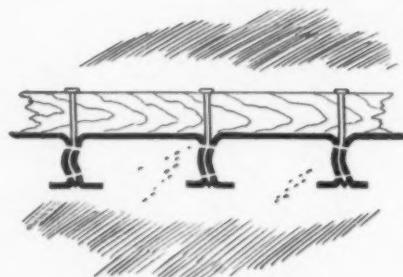
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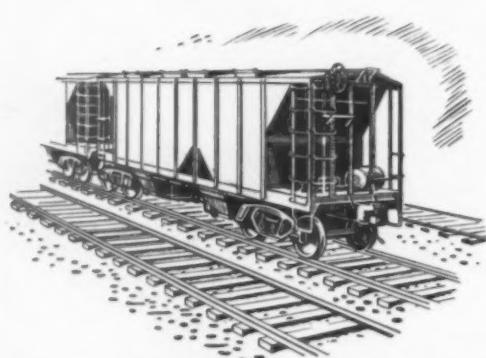




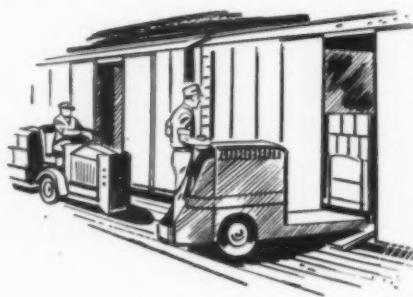
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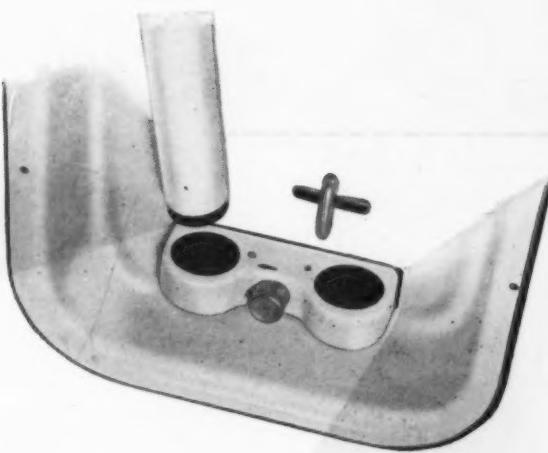
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